Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

AVMA Convention—Philadelphia, August 18-21, 1958

General Articles

The Diagnosis and Treatment of Nonspecific Infections of the Bovine Uterus and Cervix—*Harry Hardenbrook, Jr.* 459
Eastern Equine Encephalomyelitis in Pheasants—*R. E. Kissling* 466

Surgery and Obstetrics

A New Method of Fracture Fixation Using the Modny Nail—*Edward Garner* 470
A Drier for Surgeons' Gloves—*W. O. Slappey and R. T. Stapleton* 474
Surgical Correction of Traumatic Osteomyelitis in the Cow—*D. D. Delahanty* 474
Trichomoniasis in an Artificial Insemination Bull Stud—*Gabel—Tharp—Thorne—Groves—Koutz—Armstutz* 476

Clinical Data

Control of Infectious Synovitis in Chickens. VI. Chlortetracycline in Field Experiments—*N. O. Olson and D. C. Shelton* 477
Disseminated Coccidioidomycosis of the Dog—*Keith T. Maddy* 483
Coccidioidomycosis in the Horse—A Case Report—*W. J. Zontine* 490
Fescue Poisoning of Cattle on Florida Muck Land—*Gibbs Ashley* 493
"Bawling Disease" in Calves—*Curtis C. Starkebaum* 495
What Is Your Diagnosis? ..... adv. p. 35

Editorial

Veterinary Anatomy, A Crumbling Cornerstone 497
"Equinus Departus" 497

The News ..... 500 **Organization Section ..... adv. p. 22**

AVMA Report ..... adv. p. 14
Correspondence .... adv. p. 4 Coming Meetings .... adv. p. 27

Contents continued on adv. pages 2 and 4

Vol. 132 June 1, 1958 No. 11

CSL

COR-HEPAGEN

Canine Distemper Vaccine and
Infectious Canine Hepatitis Vaccine
in Bronchisepticus-Streptococcus-
Typhimurium Bacterin.

The similarity of symptoms and frequent simultaneous occurrence of distemper and hepatitis demand an efficacious vaccine. Cor-Hepagen is a safe, potent, easily administered suspension of antigens for two viruses combined in a bacterin containing the secondary bacterial pathogens usually associated with these diseases.

Rigid control tests covering safety, potency and sterility assure the practitioner of an unexcelled product. Exceptionally fine colloid milling and homogenization help produce a smooth suspension that is notably free from sting. Cor-Hepagen is supplied in cartons of three 5 cc. vials, 25 x 5 cc. vials, and a 50 cc. hospital vial.

CSL

CORN STATES LABORATORIES, INC. 1124 HARNEY ST., OMAHA 2, NEBRASKA

WHEN MASTITIS CONTROL CALLS FOR SPECIAL PUNCH

Each Disposable Tube Contains:

Procaine Penicillin G 100,000 Units
Dihydrostreptomycin (base as the sulfate) 200 mg.
Sulfamerazine.....0.75 gms.
Sulfathiazole.....0.75 gms.
Neomycin (as sulfate) 50 mg.
Prednisone.....5 mg.
In a special diffusible base

"Seems like mastitis gets tougher in some herds every year" . . . veterinarians report. That's the reason for new PREDSULMYCIN with its special combination of antibiotics, sulfonamides and prednisone to catch mastitis with its defenses down.

PREDSULMYCIN contains **three** antibiotics—procaine pencillin G, dihydrostreptomycin and neomycin. These are combined with sulfamerazine, sulfathiazole and prednisone to provide bactericidal and bacteriostatic action against all organisms usually encountered in acute and chronic mastitis.

Norden

NORDEN LABORATORIES
Lincoln, Nebraska

PREDSULMYCIN is supplied in attractive new clear plastic display cartons of 12/10 cc tubes. Subject to regular quantity discounts.

New PREDSULMYCIN

Journal of the American Veterinary Medical Association

CONTENTS

Continued from Cover

SURGERY AND OBSTETRICS

Sex Control via Centrifugation 475
Prolapsed Rectum of the Pig 476
A Metal-Tipped Plastic Intravenous Needle 476

CLINICAL DATA

Avian Infectious Hepatitis 482
Insect Transmission of Brucellosis 482
Coccidioidomycosis in Dogs 489
Encephalitis and Hog Cholera 492
Experimental Leptospirosis in Swine 492
Traumatic Gastritis and Magnets 494
Transmitting Infection with a Syringe 494

NUTRITION

Silage a Factor in Bovine Ketosis 496
Estrogen in Alfalfa Silage 496
Rickets and an Osteodystrophy in Swine 496
The Rachitogenic Effect of Vitamin A 496
Food Poisoning Due to Zinc 496
Feed Additives Fail to Control Enterotoxemia in Lambs . 496

CURRENT LITERATURE

Abstracts

Estrogenic Stimulation in Anestrous Ewes 498
Effects of Feeding Fluorine to Dairy Cattle 498
Staphylococcic Alpha Toxin 498
Control of Chronic Respiratory Diseases 498
Urinary Estrogens of the Pregnant Sow 499
PPLO of Avian Origin 499

Books and Reports

Aids to Public Health 499
Lecture Notes on the Use of the Microscope 499
Atomic Energy in Agriculture 499
Poison on the Land 499

EDITORIAL STAFF: W. A. Aitken, *Editor in Chief;* Wayne H. Riser, *Editor, Small Animal Medicine;* J. G. Hardenbergh, *Managing Editor;* Helen S. Bayless, *Assistant Editor and Advertising Manager;* Eva G. Bailey, *Assistant to the Editor;* Dinah Polen, *Assistant Advertising Manager.*

COMMITTEE ON JOURNAL: L. M. Hutchings, *Chairman;* W. W. Armistead, R. E. Rebrassier (Board of Governors).

$15.00 per Annum **Single Copies, $ .75 Prepaid in U.S.**
Canada and Pan American Countries, $15.50; Foreign, $16.50
Published semimonthly at 600 S. Michigan Ave., Chicago 5, Ill., by the American Veterinary Medical Association. Second class mail privileges authorized at Chicago, Ill., January, 1956. Additional entry at Mendota, Ill.

NOW... A

*"tamed iodine"**

FOR HARD-TO-MANAGE SKIN CONDITIONS

Weladol†

(Polyalkyleneglycol Iodine Complex)

CREME AND SHAMPOO

gives you iodine's potent fungicidal and bactericidal action

... *without* iodine's characteristic toxicity, irritation or stain

Weladol . . . 6 years in the laboratories . . . 3 years in clinical evaluation . . . has been used successfully and safely in a wide range of hard-to-manage skin conditions of dogs, cats, horses and other species of large and small animals.

†U. S. Patent No. 2,759,869 *Trademark

Write for summary of clinical reports on **"Tamed Iodine" in Veterinary Medicine.**

Weladol Shampoo in 4 fluid ounce plastic bottles and 1 quart glass bottles
Weladol Creme in 1 ounce and 1 pound jars

PITMAN-MOORE COMPANY DIVISION OF
ALLIED LABORATORIES, INC.
Indianapolis 6, Indiana

Correspondence

April 11, 1958

Dear Dr. Aitken:

I am somewhat disturbed by the article by Sutter *et al.*, "Observations on the Therapeutic Activity of Cuprous Iodide" (*J.A.V.M.A.*, April 1, 1958: 279-280). It would be interesting to learn the opinions of well-qualified pharmacologists, toxicologists, and pathologists regarding this article. However, I have some comments and questions of my own.

At no place in the paper do I find any mention of danger of copper poisoning or the maximum permissible dosage of copper. Any reference is lacking to the reported recent introduction of cuprous iodide in cattle and pigs. Thus the resultant paragraph is meaningless. Under clinical observations I wonder about the possible excessive dosage of copper. The specific nature of the skin lesions is most obscure.

The possibility of excessive dosage of copper for rats, as indicated under methods, should also be considered. The general effect of the various procedures and treatments on the rats are not given at any point in the paper. These are considered essential for even partial evaluation of the fluid contents of the "pouches."

Truant is quoted as having shown that reduction of the croton oil granuloma pouch represents true anti-inflammatory activity. However, this is in the form of a personal communication and supporting data for the reported conclusions are not available. Nor do the authors clearly indicate what they mean by "anti-inflammatory activity." To do so appears desirable and information on possible advantages and disadvantages would be helpful.

I present these questions and comments because of the common problem of canine dermatoses. I believe that this article could stimulate practitioners to initiate cuprous iodide therapy of troublesome canine skin cases with possible disastrous results, such as acute and chronic copper poisoning.

However, I do believe that the matter warrants further study with due respect of copper as a poison and for the patient as a whole.

Sincerely yours,

s/CHARLIE N. BARRON,
Major, U.S.A.F. (V.C.)
Washington, D. C.

CONTENTS—*Continued*

THE NEWS

Sixteenth International Veterinary Congress to Be Held in Madrid 500
Change in A.F.I.P. Policy for Veterinary Pathological Specimens 500
Veterinary Radiological Health Course Held 501
Among the States and Provinces 501
Foreign News 504
U.S. Government 504
State Board Examinations 505
Deaths 505

MISCELLANEOUS

Cattle and Beef Imports 464
Cows in U. S. Rank Ninth in Milk Production 464
Purebred Livestock Registrations 464
Popularity of Canine Breeds 465
"Visna," a Nervous Disease of Sheep 468
Two Hemoglobin Components of the Chicken 468
Control of Coccidiosis in Calves and Chickens with Chlortetracycline ... 468
Epidemiology of Toxoplasmosis 468
Toxoplasmosis in Mink 468
Ecology of Equine Encephalomyelitis . 468
Mucosal Disease in Iowa 469
Two Uses of Tranquilizers for Livestock 469
Tranquilizing Chickens 469
Synergistic Action of Gamma Globulins and Antibiotics 469
Rabies in Bats, Moles, and Cattle 469
Aujeszky's Disease 469
Serological Tests and Animal Relationships ..... adv. p. 31
New Pleasure-Type Horses .... adv. p. 36
Suppressing Excessive Growth in Young Females with Estrogen adv. p. 42
Seeing Eye Dogs ..... adv. p. 42
Job Opportunities in "Agribusiness" ..... adv. p. 48

ORGANIZATION SECTION

More About the Ninety-Fifth Annual AVMA Convention ..... adv. p. 22
Applications ..... adv. p. 25

. . . produces

general tractability

in all species

Promazine

HYDROCHLORIDE

injectable

FORT DODGE®

an effective and safe ataraxic

. . . exerts a profound calming action

. . . allays stress and acute nervous system excitation . . . reduces rebellion

IN A CONVENIENT, ECONOMICAL SIZE

30 cc. vial . . . 50 mg. per cc.

Onset of tranquilization: In large animals, usually 10–15 minutes intravenously, or 25–40 minutes, intramuscularly; in dogs, usually 5 minutes, intravenously, or 20–30 minutes, intramuscularly. Duration of action varies with dosage, but usually lies within a range of 4 to 6 hours.

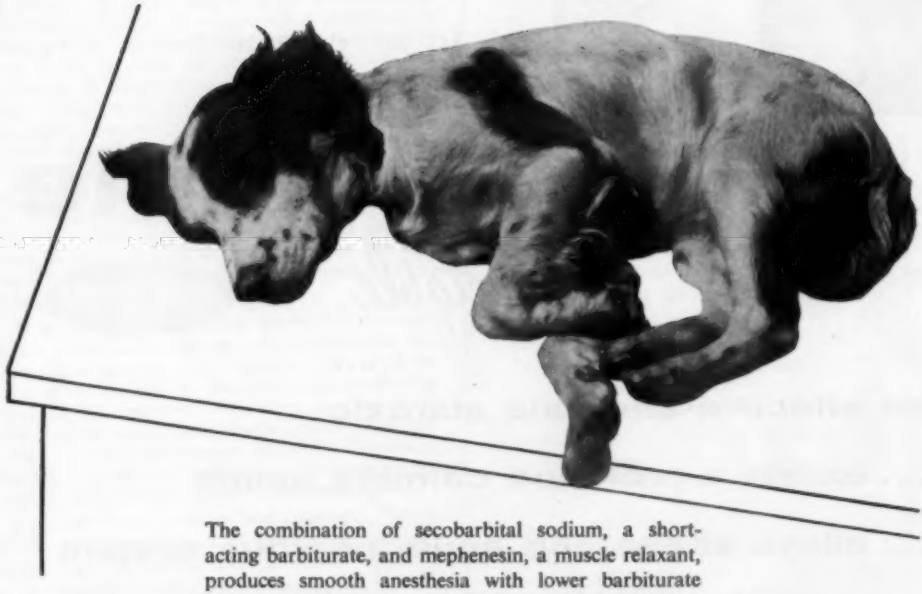
Licensed under U. S. Patent Nos. 2607773, 2519886, 2769002 and 2799619.

FORT DODGE LABORATORIES, INC., Fort Dodge, Iowa

Smoother induction...

Quieter awakening...

in small animal anesthesia



The combination of secobarbital sodium, a short-acting barbiturate, and mephenesin, a muscle relaxant, produces smooth anesthesia with lower barbiturate dosage. Myothesia also provides better relaxation during surgery and fracture work. These advantages make it an ideal anesthetic for small animals.

Myothesia

Supplied in 100 cc. vials, each cc. containing secobarbital, 50 mg. (¾ gr.) and mephenesin, 30 mg. (5/12 gr.)
Send for descriptive literature

THE S. E. MASSENGILL COMPANY
Veterinary Division • Bristol, Tennessee

new for dermatitis
faster, more effective results
safe, easy to use

FOSTEEN®

antiseborrheic . . . keratolytic
antibacterial . . . antifungal

Use as a therapeutic shampoo in eczemas, seborrheic dermatitis, scaly skin, otitis externa, nonspecific dermatitis, demodectic mange, fungus infections.

***Available** in 4.5 oz. and 3 lb. jars.*

Clinical results in 592 dogs

Condition	Total Number	Good to Excellent Results
Weeping dermatitis ("Moist Eczema")	217	200-(92%)
Dry dermatitis ("Summer Eczema")	238	190-(80%)
Seborrheic dermatitis (including otitis externa)	137	127-(93%)

The effectiveness of FOSTEEN is provided by Sebulytic® (dioctyl sulfosuccinate, alkyl aryl polyether sulfonate and lauryl sulfoacetate) a new combination of surface active cleansing, penetrating and wetting agents with remarkable *antiseborrheic, keratolytic, antibacterial* and *antifungal* action—enhanced by sulfur 2%, salicylic acid 2% and hexachlorophene 1%.

order FOSTEEN from these distributors

A. J. Buck & Son
Baltimore 13, Md.

Arizona Veterinary Supply Co., Inc.
Mesa, Ariz.

Barber Veterinary Supply Co., Inc.
Richmond 20, Va.

Central City Chemical Consolidated
San Francisco 5, Calif.

Central Surgical Supply Co.
Fitchburg, Mass.

Chicago Veterinary Supply, Inc.
Chicago 18, Ill.

Columbus Serum Company
Columbus 7, Ohio
Indianapolis, Ind.

Edwards Veterinary Supply Co.
Kansas City 8, Mo.

Frank E. Lentz Co.
Philadelphia 4, Pa.

Gertrude Devine Veterinary Supplies
Goshen, N. Y.

Holmes Serum Company
Springfield, Ill.

L. A. Mosher Co.
Atlanta, Ga. — Louisville, Ky.
Albany, Ga. — Raleigh, N.C.
Miami, Fla. — Memphis, Tenn.

Mencimer Veterinary Supply
Ogden, Utah

Miller Veterinary Supply Co.
Fort Worth 4, Tex.

Nelson Laboratories
Sioux Falls, S.D.

Northland Veterinary Supply Co.
St. Paul 4, Minn.

Northwest Veterinary Supply Co.
Oregon City, Ore.
Seattle, Wash.

Pioneer Laboratories
Houston, Tex.

Sharpe & Vejar Company
Los Angeles 64, Calif.

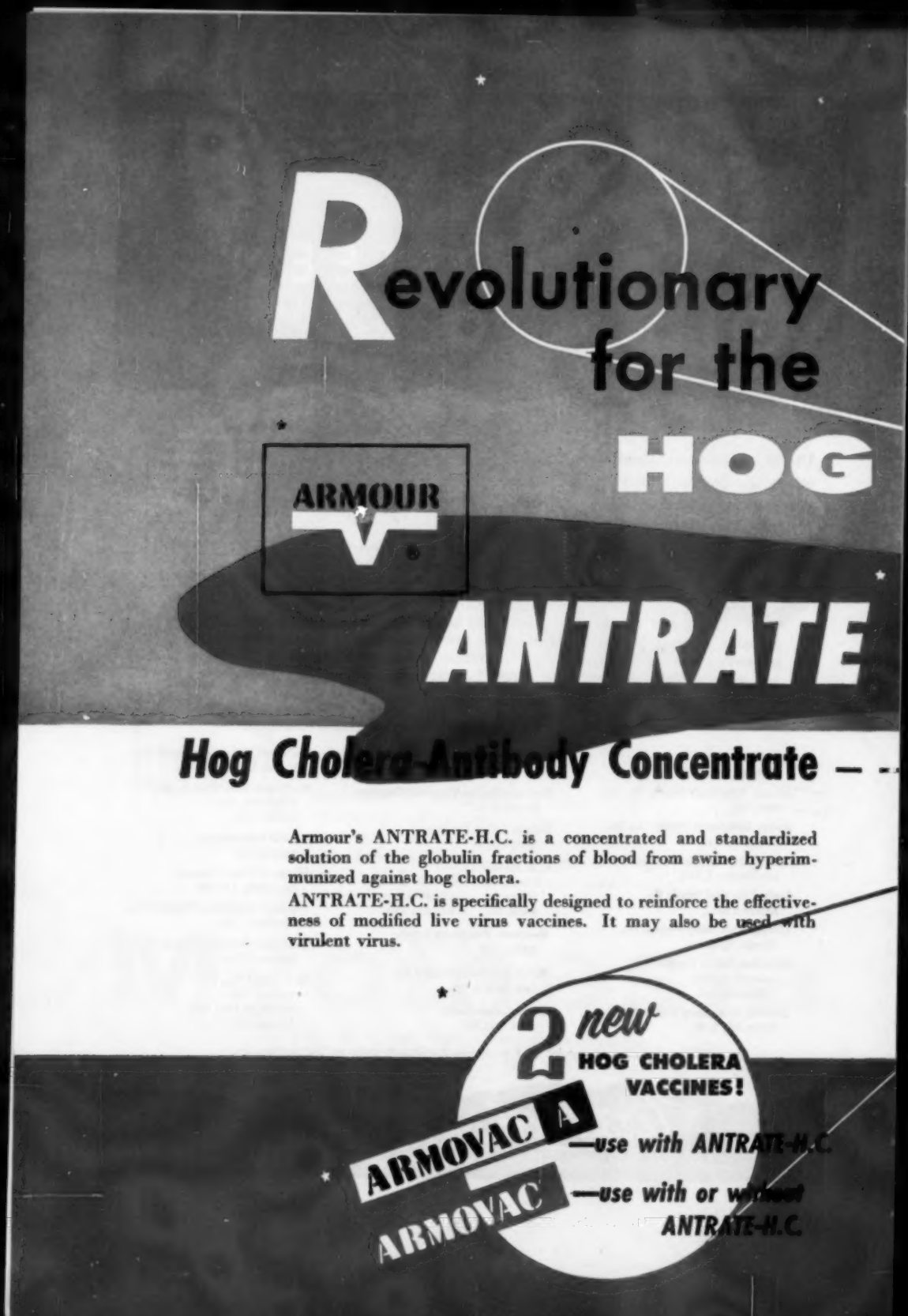
Standard Veterinary Products Co.
New York 1, N.Y.

Wisconsin Biological Supply Co.
Madison 3, Wis.

H. C. Burns Co., Inc.
Oakland, Calif.
Huntington Park, Calif.
Portland, Ore.

Write for clinical reprint and samples. Available only to the profession.

Westwood PHARMACEUTICALS
Division of Foster-Milburn Co. • 468 Dewitt Street, Buffalo 13, New York


Revolutionary for the HOG
ARMOUR
ANTRATE
Hog Cholera Antibody Concentrate — --
Armour's ANTRATE-H.C. is a concentrated and standardized solution of the globulin fractions of blood from swine hyperimmunized against hog cholera.
ANTRATE-H.C. is specifically designed to reinforce the effectiveness of modified live virus vaccines. It may also be used with virulent virus.
2 new HOG CHOLERA VACCINES!
ARMOVAC A
—use with ANTRATE-H.C.
ARMOVAC
—use with or without ANTRATE-H.C.

ARMOUR VETERINARY

new weapon control of CHOLERA

– H.C.

Twice the Potency of anti-hog cholera serum

- Is standardized to twice the potency of anti-hog cholera serum.
- Requires only half the volume dose of serum.
- Can be used with confidence in all instances where hog cholera serum is indicated.
- Gives easier, faster vaccinating.
- Minimizes post-injection leak-back.
- Is fully field tested in thousands of swine.
- Is backed by over five years of research.

When vaccinating for hog cholera, use Armour's ANTRATE-H.C. Enjoy the faster vaccination and the convenience of handling. Call your Armour salesman today for your ANTRATE-H.C. requirements.

Packaged in bottles of 250 cc.
Provides the same number of doses as a 500 cc. bottle of serum.

ARMOUR

VETERINARY LABORATORIES
A Division of Armour and Company
KANKAKEE, ILLINOIS

Canine Distemper Vaccine

Modified Live Virus

Chick Embryo Origin, Vacuum Dried

For active immunization of dogs against canine distemper

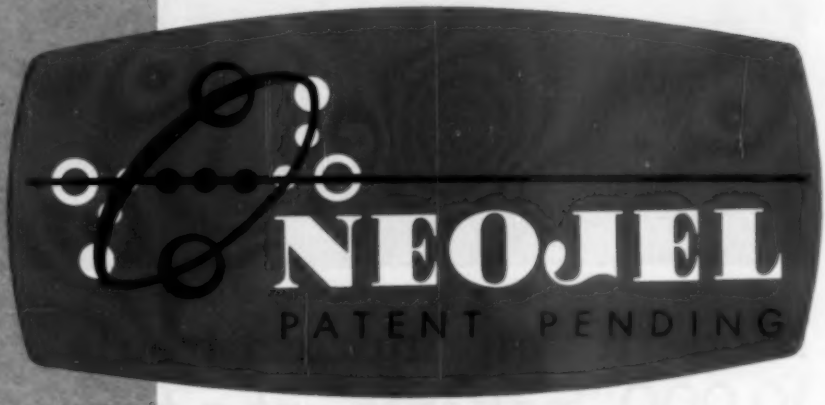
* *We are pleased to announce that we are back in the biological field*

Information and prices sent on request.

Winthrop LABORATORIES • NEW YORK 18, N. Y.

GET THE EXTRAS

offered by



★Longer Immunity
★Minimum Reactions
★Smaller Dosage

NEOJEL, NOW USED IN NEO-VAC (ERYSIPELAS BACTERIN) AND LEPTOSPIRA POMONA BACTERIN, WILL BE USED IN DIAMOND'S COMPLETE LINE OF KILLED ANTIGEN PRODUCTS.

DIAMOND LABORATORIES

DES MOINES • IOWA

sales exclusively to veterinarians

Modern methods of meat production often demand medicated feeds.

Modern veterinarian treats 10,000 "patients" at a time

Mass medication, with the objective of disease prevention as well as treatment, is the coming practice in taking care of livestock and poultry. It enables the veterinarian to treat 10,000 "patients" at a time.

There are two indispensable steps in mass medication: (1) Correct diagnosis; (2) Correct dosage.

Correct diagnosis can come only from the veterinarian, and we recommend that he be called before a feeder goes to the expense and risk of applying medication.

Correct dosage usually can be applied best in medicated feeds produced by a formula-feed manufacturer capable of precise blending of ingredients.

You can depend upon adequate dosage when medication is in Purina Chows. Purina's exclusive Micro-Mixing process can blend medicinals accurately in the ratio of five grains to a ton. Purina Micro-Mixing is tested by a method so accurate that it can detect one part of test material in ten million. Drop in at a nearby Purina Dealer's store and ask him to tell you what medication is available in Purina Chows. You can depend on the Checkerboard!

PURINA . . . YOUR PARTNER IN SERVING ANIMAL AGRICULTURE

This is an advertisement

another veterinary FIRST from Nicholson

THE FIRST MODERN ELECTRONIC EJACULATOR

Trans-Jector®, Nicholson's NEW all-transistor bull/ram ejaculator weighs only 16½ pounds!

by Donald M. Nicholson

I am very proud to be writing this article about our new Trans-Jector because it marks the successful conclusion of prolonged testing and study in this field!

Our new Trans-Jector is the first bull/ram ejaculator really designed for field conditions. You see, we made it with *electronic transistors* instead of old-fashioned fragile vacuum tubes!

Weighs Only 16½ Pounds. Transistors mean you can lug it around easily — for it weighs only 16½ pounds! Other models (with vacuum tubes) in this line weigh as much as 75 pounds! The size is only 4″ x 7″ x 18″.

Since we used transistors, the Trans-Jector is *not* a fragile instrument. It can take abuse. We made it to go anywhere.

The probe for this unit weighs only two pounds! Veterinarians now using the Trans-Jector have approved its lightness, dependability and easy portability. The unit complete FOB Denver costs $469.00.

Portable Field Laboratory. In addition to this equipment, we have built as an accessory a complete portable field laboratory. This is a thermostatically controlled, heated case which will contain your microscope, slides, cover plates, sub-stage lamp — all maintained at body temperature! This unit costs $195.00 FOB Denver.

Also, for a portable power supply, we offer a choice of converters taking power off your car battery — or a generator replacement for your car that will deliver guaranteed extra power to operate the Trans-Jector.

Coupon Brings Details. I will be pleased to send you complete information about the Trans-Jector by return mail if you will fill in the coupon below. There is no charge or obligation. Mail the coupon today please.

Nicholson Manufacturing Inc.
3900 Ulster, Denver 7

Dear Mr. Nicholson: Please send me information about the new Trans-Jector electronic ejaculator.

DVM

street

city/state

AVMA Report

Scientific Exhibits in Philadelphia

An Opportunity for Increased Knowledge

Each year as the stockpile of veterinary medical knowledge grows, it becomes increasingly difficult for the individual to assimilate all of this data through the written word alone.

A relatively new vehicle of communication, however, has come into use as an effective means of conveying information to the professions — the exhibit. More and more educational institutions, research organizations, governmental agencies, and others are utilizing exhibits to report the results of significant work in numerous fields of study.

In order that such organizations may have an opportunity to present their studies in this fashion to the veterinary profession, the AVMA Convention in Philadelphia will feature the following scientific exhibits for the benefit of those attending the meeting:

Chronology of Tooth Development in Cattle
University of Illinois, College of Dentistry

Veterinary Medicine at the University of Illinois
University of Illinois, College of Veterinary Medicine

Roentgen Diagnosis
University of Pennsylvania, School of Veterinary Medicine

The Beginnings of Veterinary Neuroanatomy
Michigan State University, College of Veterinary Medicine

Radiographic Contrast Media — Canine Medicine
National Institute of Health, Animal Hospital Section

Nuclear War and Survival
Walter Reed Army Medical Center, Division of Veterinary Medicine

Highlights of a Decade of Progress in Health
Pan American Sanitary Bureau W.H.O.

Pathology in Poultry Inspection
U.S.D.A. Poultry Division, A.M.S.

Air Force Base Veterinary Activities
Human Tolerance to Mechanical Forces
Human Factors in Space Flight
Pathology of Experimental Animals Used in
Acceleration and Deceleration Studies
United States Air Force Medical Service

Veterinarians in Federal Meat Inspection
Brucellosis Eradication
U. S. Department of Agriculture

Doctor! are the cards being stacked against you?

We Americans are noted for our sense of fair play. Nowhere in the world are doubtful practices frowned on as they are here.

This is why we wonder about the distribution methods of those suppliers of veterinary products that sell for use by laymen. No doubt their sales are higher. But what are they doing to the veterinary profession?

Surely the indiscriminate use of veterinary products by untrained persons can do much to undermine *your* practice and prestige. Could this not eventually do great harm to the livestock industry as well?

We're concerned because we have unalterably cast our lot with you, the graduate veterinarian. Now, we like competition—that's what makes this country great. And we respect an honest difference of opinion. However, we feel this goes further than merely choosing up sides. We feel there is an important professional issue at stake.

Maybe we're taking this matter of professionalism too seriously, but as one team member to another, we'd like to ask you this question:

DOCTOR, ARE THE CARDS BEING STACKED AGAINST YOU?

Affiliated

AFFILIATED LABORATORIES CORPORATION

White Hall, Illinois

Grain Belt Supply Co.
Corn Belt Laboratories, Inc.
The National Laboratories Corp.
The Gregory Laboratory, Inc.

PRODUCED FOR AND SOLD TO GRADUATE VETERINARIANS ONLY

YOU'VE said good-by to the bride who was once your little girl, and to that handsome boy who is now your son. The youngsters are on their own: and so, after twenty-odd years, are you! Now is the time to think of yourselves—your pleasures, your security, your eventual retirement. A good time to start putting part of your savings away in safe, sure, United States Savings Bonds. Where nothing can touch your principal. And where your money earns 3¼% when bonds are held to maturity. Series E Bonds grow in value, year by year—and Series H Bonds pay you interest twice a year. Whichever you choose, start your bond program today! When financial independence counts, count on U. S. Savings Bonds!

The U. S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers Association.

How well do you know the entire family of

BIOLOGICALS distributed by SQUIBB?

SQUIBB OFFERS THE VETERINARY PROFESSION a complete line of vaccines and serums. Each is described at the right. Note particularly that Tri-jex makes it possible for you to immunize dogs against distemper, hepatitis and important secondary bacteria with a *single product*. Note also that Sin-jex and Femulgen are "one-shot" vaccines, permitting the inoculation of difficult patients with a single handling.

All biologicals distributed by Squibb are of unsurpassed quality, tested and retested to safeguard purity and potency. Use them with confidence. There are no finer vaccines and serums available anywhere today.

BIOLOGICALS distributed by SQUIBB are sold to VETERINARIANS ONLY. They are quickly available from your favorite wholesaler or any one of the Squibb branches listed below.

Atlanta, Ga., 820 Spring Street, N. W.
Cambridge, Mass. (Boston), 31 Cambridge Parkway
Franklin Park, Ill. (Chicago), 2645 Rose Avenue
Cleveland, Ohio, 6603 Euclid Avenue
Denver, Colo., 4940 Jackson Street
Houston, Texas, 1 Main Street
Kansas City, Mo., 2500 West Pennway
Long Island City, N. Y., 41-50 22nd Street
Los Angeles, Cal., 2535 Eastland Avenue
Minneapolis, Minn., 740 Washington Avenue, N.
Philadelphia, Pa., 410 No. Broad Street
San Francisco, Cal., 690 Fourth Street
St. Louis, Mo., 4560 Audubon Avenue
Seattle, Wash., 804 Sixth Avenue, South

© OLIN MATHIESON CHEMICAL CORPORATION, 1958

Tri-jex, Sin-jex, Femulgen are trademarks.

TRI-JEX

...contains killed viruses of canine distemper and infectious canine hepatitis, plus killed cultures of *Brucella bronchiseptica, Streptococcus pyogenes* and *Salmonella typhimurium*. Dogs are protected against two of their most serious virus diseases as well as the important secondary bacteria usually associated with these diseases. Tri-jex confers immunity quickly. *Supplied in 3 x 5 cc.*—1 dose vials and 50 cc. vials.

SIN-JEX

...good immunity against canine distemper and infectious hepatitis at the same time with a single injection. Sin-jex is the first successful combination of a vacuum dried, modified live virus distemper fraction (chick embryo origin) with a killed virus hepatitis fraction as diluent. Sin-jex is instantly reconstituted into a fine homogeneous suspension which passes easily through a 22 gauge needle, and produces immunity in less than 2 weeks. *Supplied in 6 x 3 cc.*—1 dose vials.

FEMULGEN

...single-injection vaccine for immunization against feline distemper (feline infectious enteritis, malignant panleucopenia, infectious feline agranulocytosis, etc.) Femulgen is a homologous vaccine, prepared from the tissues of young susceptible cats inoculated with virulent feline distemper virus. This virus is extracted, inactivated with formalin and suspended in an oil emulsion. *Supplied in 5 x 1 cc.*—1 dose vials, with disposable syringe.

RABIES VACCINE

...both phenolized and chick embryo origin, for positive immunization against rabies for a period of one year. *Supplied in 5 x 3 cc.*—1 and 10-dose vials for live virus, chick embryo origin, 50 cc. vials for phenolized suspension.

ANTI-CANINE DISTEMPER SERUM and **ANTI-INFECTIOUS HEPATITIS SERUM**

...immediate passive immunity against canine distemper and infectious hepatitis. *Supplied in 100 cc. vials.*

CANINE DISTEMPER VACCINE

...modified live virus, chick embryo origin, for immunization against distemper in dogs. *Supplied in 6 x 2 cc.*—single-dose vials.

Announcing...

A MAJOR SQUIBB ACHIEVEMENT IN ANTI-MASTITIS THERAPY

NEOTHION*

VETERINARY (Squibb Thiostrepton-Neomycin in Plastibase.®)

THE NEWEST BROAD SPECTRUM FORMULATION NOW AVAILABLE FOR **MASTITIS** CONTROL.

NEOTHION contains THIOSTREPTON

an important *new* antibiotic isolated by SQUIBB, plus NEOMYCIN, of proved broad spectrum activity

WITH THE INTRODUCTION OF NEOTHION, an important new antibiotic makes its bow to the veterinary profession: *Thiostrepton.*

Thiostrepton was isolated at the Squibb Research Laboratories and quickly recognized as an antibiotic of unusual potential. Tests soon confirmed its early promise, and proved beyond doubt that a new antibiotic had been discovered which makes possible a degree of control over mastitis never before achieved.

Of particular importance to veterinarians is Thiostrepton's high order of activity against mastitis-causing organisms which are becoming increasingly more resistant to the antibiotics now in general use.

THIOSTREPTON COMBINED WITH NEOMYCIN. Thiostrepton is highly effective against gram-positive cocci. Combined with Neomycin, the resulting formula offers veterinarians a broader spectrum than any other single antibiotic now available for the treatment of mastitis. Christened NEOTHION, this new Squibb product is today's effective answer to the problem of *fast, effective, safe* and *economical* anti-mastitis therapy.

NEOTHION PENETRATES MASTITIS "RESISTANCE BARRIER." Present-day antibiotics are becoming less and less effective because mastitis-causing bacteria are becoming more

and more resistant to them. Because of its high order of activity against these resistant bacteria, NEOTHION controls *all known types* of bacterial mastitis with greater speed and dependability. Further, because NEOTHION contains more highly effective antibiotics, a lower dosage level can be used with the full confidence that a superior treatment has been administered.

NEOTHION . . .

SAFE, FAST AND EFFECTIVE FOR TREATMENT OF

- all known types of bacterial mastitis, both chronic and acute
- mastitis caused by bacteria which have become resistant to other antibiotics, or which other antibiotics are unable to control
- mastitis when the cause of infection has not been determined

NEOTHION . . .

- no undesirable side reactions
- cannot harm the most delicate udder tissue
- free from hazard of sensitization reactions from penicillin
- made with exclusive Squibb Plastibase® for rapid release of antibiotics, ease of application and proper consistency.

NEOTHION IS THE NEWEST BROAD SPECTRUM FORMULATION ON THE MARKET TODAY. ONLY NEOTHION CONTAINS THIOSTREPTON TO PENETRATE THE MASTITIS "RESISTANCE BARRIER"

COMPARISON OF ACTIVITY OF SPECTRUM	GRAM-POSITIVE BACTERIA			GRAM-NEGATIVE BACTERIA					
	STAPHYLOCOCCI	PNEUMOCOCCI	STREPTOCOCCI	BRUCELLA	E. COLI	COLIFORMS	HEMOPHILUS	PROTEUS	PSEUDOMONAS
Triple Sulfas	▨	▨	▨	▨	▨	▨	▨	▨	
Penicillin	▨	▨	▨	▨					
Streptomycin			▨	▨	▨	▨	▨	▨	
Neomycin	▨		▨		▨	▨	▨	▨	▨
Brand A BROAD SPECTRUM ANTIBIOTIC	▨	▨	▨	▨	▨	▨	▨	▨	
Brand B BROAD SPECTRUM ANTIBIOTIC	▨	▨	▨	▨	▨	▨	▨	▨	
Brand C BROAD SPECTRUM ANTIBIOTIC	▨	▨	▨	▨	▨	▨	▨	▨	
NEOTHION	▨	▨	▨	▨	▨	▨	▨	▨	▨

Neothion is available from your SQUIBB branch or your ethical wholesaler. Neothion is sold *only to veterinarians.*

NEOTHION® and PLASTIBASE are Squibb trademarks.

DOSAGE **Acute mastitis:** contents of 1 syringe of Neothion in each infected quarter every 12 hours or after each regular milking. Inflammation generally subsides and milk regains normal appearance after 1 to 6 infusions.

Chronic mastitis: contents of 1 syringe of Neothion in each infected quarter every 12 hours or after each regular milking. Continue treatment for 1 to 3 instillations or until milk regains normal appearance and other signs of infection disappear.

SUPPLY **Neothion Veterinary is supplied in 1-dose syringes containing 50,000 units of Thiostrepton plus 150 mg. of Neomycin.**

for additional information, write
SQUIBB, *Veterinary Department,*
745 Fifth Avenue, New York 22, N. Y.

SQUIBB

—A NAME YOU CAN TRUST

© OLIN MATHIESON CHEMICAL CORPORATION, 1958

HIGHER, MORE PROFITABLE WEIGHT GAINS

plus

FINER FINISH

2 excellent reasons to recommend

SYNOVEX®

SQUIBB STEER FINISHING IMPLANTS

SYNOVEX BOOSTS RATE OF GAIN ALMOST ⅓ LB. EXTRA PER STEER PER DAY IN MISSOURI.

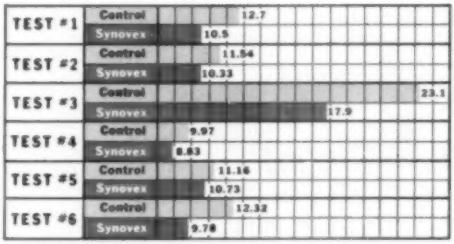
These photographs were taken with the permission of Mr. Jack Schmidt, Manager of the Morris Feed Yards, Kansas City, Mo. Says Mr. Schmidt: "We have since purchased over 1,000 (Synovex) implants and are looking forward to the same splendid results as this last test."

WHEN HE MARKETS HIS STEERS, every feedlot man wants his animals to make the finest showing—both in the selling pen and on the scales. To help him accomplish this, *at the lowest net cost per pound of gain,* recommend Synovex.

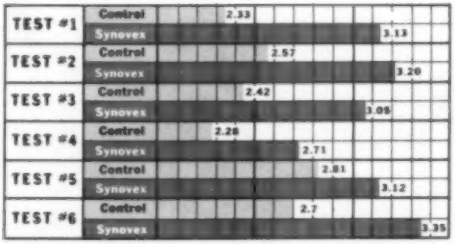
- The unretouched photographs above show (1) a rib section chosen at random from a group of steers implanted with Synovex, (2) a rib section from a steer chosen at random from a group of unimplanted controls.
- NOTE EXCELLENT QUALITY, TEXTURE, COLOR AND MARBLING OF MEAT. Compare. Synovex-implanted steers show *finer finish* and dress out with a higher percentage of lean and less separable fat. Cooler shrink is normal—Synovex does not cause excessive moisture retention in tissues. Your clients get up to *½ lb. extra per steer per day* without risk of downgrading on the hoof, on the hook, or in the display case.

SYNOVEX SAVES UP TO 5c PER LB. OF GAIN. Only Synovex contains progesterone and estradiol benzoate, the two naturally-occurring hormones which give Synovex its remarkable ability to stimulate higher weight gains *safely*. Synovex goes to work in minutes after implant is made; increased rate of gain is apparent after 30 days; feed conversion is improved as much as 20% over controls. Tests have proved that Synovex increased rate of gain up to 50% over Stilbestrol!

NEW TESTS PROVE SUPERIORITY OF SYNOVEX. The two charts prove that Synovex stimulates higher profits as well as higher weight gains. Note dramatic improvement in feed conversion and rate-of-gain when Synovex is used with a good ration. These figures prove again that Synovex is today's outstanding product for more profitable feedlot operation.



Lb. of feed per lb. of gain



Gain per head per day

SYNOVEX IS AVAILABLE FROM YOUR SQUIBB BRANCH OR YOUR WHOLESALER IN 10-IMPLANT AND 100-IMPLANT PACKAGES FOR YOUR USE AND DISPENSING. ONE IMPLANT LASTS A FULL 150 DAYS. SYNOVEX IS RECOMMENDED FOR STEERS WEIGHING FROM 400 TO 1000 POUNDS.

© OLIN MATHIESON CHEMICAL CORPORATION, 1958

Synovex has been cooperatively developed by E. R. Squibb & Sons and Syntex. Synovex is a registered Squibb trademark.

OLIN MATHIESON CHEMICAL CORPORATION SQUIBB

to control these topical infections

ringworm, fungus infections
eczema, hot spots
acute erythematous and moist dermatitis
otitis externa
minor cuts and wounds
paronychia, balanitis
pyogenic infections

choose the form you prefer

Triocil

TRADEMARK — BRAND OF HEXETIDINE

Whichever form you use on small and large animals, you can count on these outstanding Triocil properties: broad-spectrum activity . . . no development of resistant bacterial strains . . . prolonged tissue affinity that defies licking and rubbing off.

***New* Triocil Spray. Apply to irritated or inflamed areas without disturbing tissue. Bactericidal, fungicidal, easy-to-use. Dispense to clients for assurance of continuous therapy. For pre-surgical preparation, too.**

Use Triocil Ointment for topical infections confined to smaller or separated areas. Triocil Solution, in a shampoo-like detergent base, is best for generalized infections and as prophylaxis against recurrence.

Paxital
TRADEMARK

mepazine

aids in controlling symptoms of canine chorea

Anabolin
TRADEMARK

metabolic regulator

adjunctive therapy for dermatologic problems

DIVISION OF VETERINARY MEDICINE
WARNER-CHILCOTT
MORRIS PLAINS, NEW JERSEY

products for the profession—available only through veterinary distributors

Provide profit insurance . . .

Cuts weight losses in transport of feeder cattle

Tranquilization reduces response to various excitatory stimuli incidental to handling, loading and transportation of livestock. TRILAFON minimizes factors contributing to weight loss. **Savings may be estimated in terms of pounds—and dollars—per head.**

Relieves shipping fatigue and lowered resistance to infection

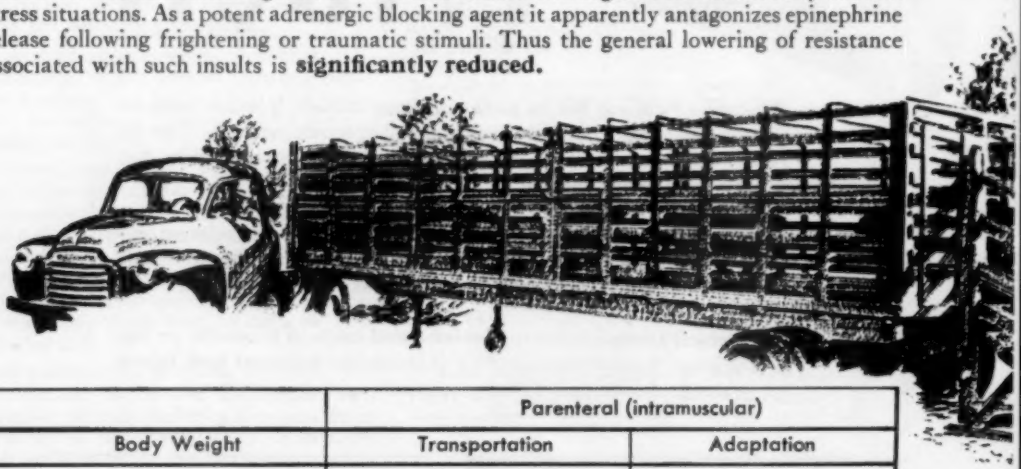
TRILAFON significantly reduces weight loss and incidence of respiratory disease (shipping fever) and diarrhea in animals subjected to traumatic shock during handling and shipment. Animals subjected to fright and deprivation of food and water normally suffer lowered resistance to infection.

Eases adaptation to new environments and management practices

TRILAFON facilitates transition from range or pasture to feedlot environment. Bawling, milling and fence walking are reduced; animals become more tractable and **go on full feed faster.** Stress induced by weaning, dehorning, castration, vaccination and other handling procedures is markedly lessened.

Reduces incidence and severity of infectious diseases aggravated by toxemia and environmental stress (when used as supportive therapy with appropriate chemotherapeutic agents)

TRILAFON shields animals against lowered resistance occurring in shock induced by various stress situations. As a potent adrenergic blocking agent it apparently antagonizes epinephrine release following frightening or traumatic stimuli. Thus the general lowering of resistance associated with such insults is **significantly reduced.**



	Parenteral (intramuscular)	
Body Weight	Transportation	Adaptation
300-600 lbs.	25-50 mg.	15-25 mg.
600-900 lbs.	50-75 mg.	50-75 mg.
900 lbs. and over	75-100 mg.	75-100 mg.

In transportation and adaptation situations low dosages will produce the desired response without reduction of psychomotor activity. In these indications a clinically apparent degree of tranquilization is not required. Thus, **prescribed doses must be carefully observed.**

Packaging TRILAFON® Injection, 25 mg./cc., 30 cc. vial, boxes of 1 and 6.

SCHERING CORPORATION • BLOOMFIELD, NEW JERSEY

V-TR-J-258

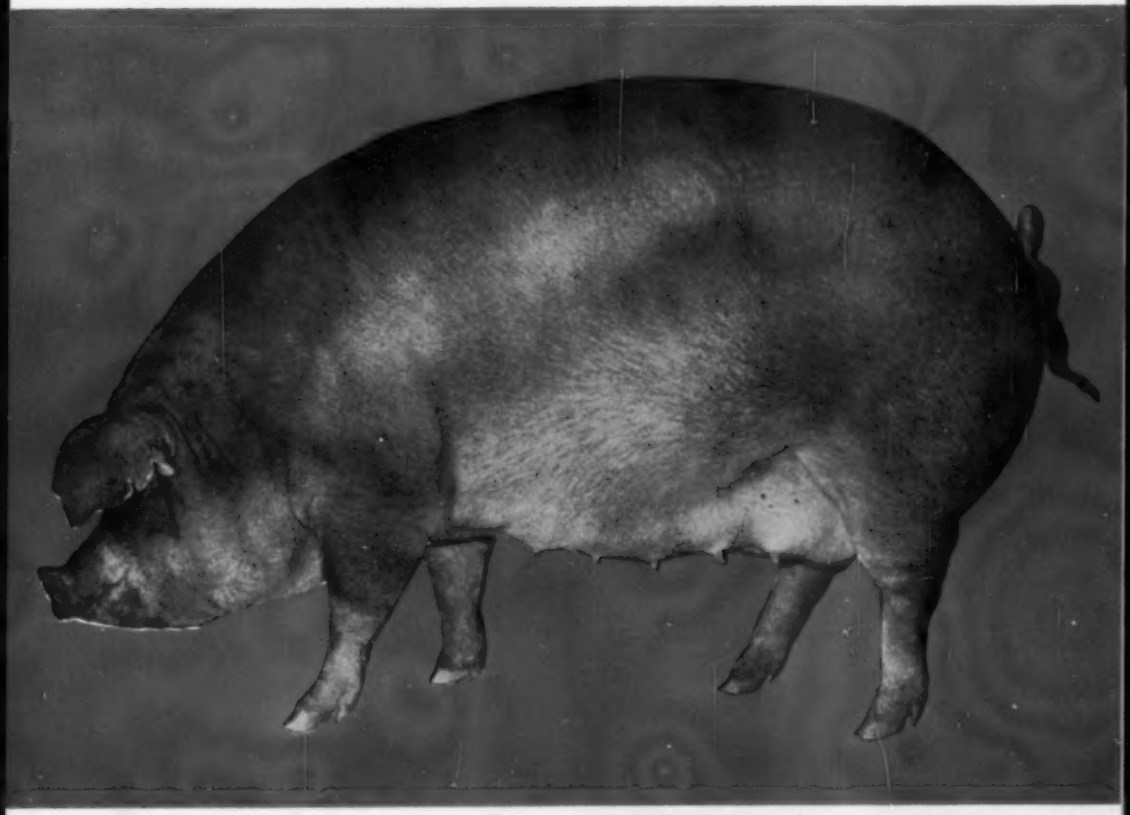
SHIELD LIVESTOCK AGAINST WEIGHT LOSSES DUE TO TRANSPORT, HANDLING AND ENVIRONMENTAL CHANGES

Trilafon

Perphenazine

Schering

THE DUROC JERSEY is believed to be descended from various breeds of red hogs imported from Europe as early as 1804. It was not until 1880, however, that the modern Duroc was developed. The breed combines large size with feeding capacity and good ability to reproduce.



"M·L·V", EXCLUSIVE TRADEMARK of Fort Dodge Laboratories, designates Fort Dodge Brand Modified Live Virus Hog Cholera Vaccine. M·L·V is the original, first-licensed such vaccine. It is prepared exclusively from swine tissues from pigs inoculated with virus previously modified in virulence by serial passage in rabbits. Solid immunity of more than three years has been demonstrated.

FORT DODGE®

M·L·V TRADEMARK

The original modified live virus vaccine.

U. S. Patent RE-23746

FORT DODGE LABORATORIES, INC., FORT DODGE, IOWA

JOURNAL
of the American Veterinary Medical Association
Established January, 1877 Chicago 5, Illinois
Vol. 132 June 1, 1958 No. 11
Copyright 1958 by the American Veterinary Medical Association

The Diagnosis and Treatment of Nonspecific Infections of the Bovine Uterus and Cervix

HARRY HARDENBROOK, Jr., D.V.M., Ph.D.
Urbana, Illinois

FOR CATTLE to maintain their place in our economy as the source of meat, milk, and other important products, they must have a high reproductive efficiency. Even before the development of formal veterinary education and research, articles advocating remedies and procedures aimed at improving fertility were published. The recommendations were largely empirical.

The rational diagnosis and treatment of certain reproductive failures became possible only after the theories of Pasteur and Koch were applied to genital diseases of cattle. In 1897, it was demonstrated that bacterial infections were an important cause of infertility.[2] Later, several authors emphasized the importance of pathological alterations of the tissues of the reproductive tract as a cause of infertility,[1,3,4] and by the 1920's the altered function of various endocrine glands began to be regarded by many as an important and major cause of reproductive failures.

Considerable factual information on many aspects of the fundamentals of reproduction is available today. Much of this information, however, needs interpretation by clinicians before it can be applied to the various cases of infertility brought to them for diagnosis and treatment.

To a bacteriologist, infertility is the result of bacterial or viral infections; to a pathologist, infertility is the result of alterations in tissues and organs which prevent the birth of living young; to an endocrinologist, infertility is the result of altered glandular function and failure of target organs to function normally. These variations in viewpoint are scientifically healthful and each must be considered by the clinician, but in its proper place, if he is not to become confused. The viewpoint expressed herein is clinical.

The terms "sterility" and "infertility" are synonymous and are signs of some underlying reproductive abnormality. Sterility can be defined as a relative or absolute, temporary or permanent, inability to reproduce living young. Under normal conditions, a cow can be considered infertile if she does not conceive after three services at different estrous periods, or if she is not pregnant six months after calving. Most animals brought to the attention of the veterinarian for reproductive failure are temporarily and relatively infertile.

Today, the specific contagious diseases of the bovine reproductive tract, as observed in Illinois, are: trichomoniasis, vibriosis, brucellosis, and granular venereal disease. Others, such as contagious epididymitis and vaginitis and PPLO infections of the uterus, probably occur.

In addition to these specific diseases, there are a number of bacterial organisms that are common in the reproductive tracts of infertile cattle. These are grouped under the heading of nonspecific infections. Micrococci are most frequently isolated from the uteri of infertile cows, but streptococci, Corynebacterium sp., diphtheroids, Proteus sp., *Escherichia coli*, or other organisms may be present. These organisms might cause sterility by the actual invasion of tissues or by producing by-products of metabolism which are irritating and responsible for local tissue re-

From the Department of Veterinary Clinical Medicine, College of Veterinary Medicine, University of Illinois, Urbana.
Presented before the Section on Surgery and Obstetrics, Ninety-Fourth Annual Meeting, American Veterinary Medical Association, Cleveland, Ohio, Aug. 19-22, 1957.

action that may prevent pregnancy. In the latter case, there may be no actual invasion of the tissues by the microorganisms.

Organisms normally harmless to the reproductive tract, in a particular herd of breeding cattle, may cause infections of the uteri and cervices of newly added females. Resistance may later develop in most of the animals, and the problem may persist as one which primarily causes infertility in the heifers of the herd.

Management practices may play a part in the development of nonspecific infections. For example, the reproductive tracts of females highly fitted for showing may be easily injured when served by a vigorous bull. Semen in contact with submucosal tissues often produces a local inflammatory reaction. When breeding injuries are complicated by infectious organisms, conception may be delayed for months. Physical examination often reveals a fibrosis of the cervix, which is the clinical manifestation of a chronic inflammation.

Each affected cow presents an individual problem. This is true even though the herd of which she is a part may have animals that are infected with one or more of the specific breeding diseases.

DIAGNOSIS

Examination of Breeding Records.—Diagnosis of nonspecific infections is based on a careful and thorough examination of each infertile cow, along with an evaluation of the breeding history of the herd and of the individual, if available. The diagnosis of these nonspecific infections without laboratory assistance is uncertain. An examination of the breeding records for the duration and type of estrous cycle may help in arriving at an accurate diagnosis. Certain types of reproduction histories that aid the clinician in deciding on the diagnosis, treatment, and prognosis of infertility in individual animals are illustrated (table 1).

Example 1 (table 1) illustrates the estrous cycle of a cow whose normal period is 20 days. She is bred, conceives, and undergoes normal pregnancy.

Example 2 illustrates a cow that is bred and conceives, but returns to estrus at 25 days. Early embryonal mortality has occurred. She then has a normal estrous cycle of 20 days. This procedure may be repeated one or more times before recovery occurs and a normal pregnancy ensues.

Example 3 is that of a cow that is bred and conceives but, after early embryonal mortality, returns to estrus in 25 days. She is not bred, and again returns to estrus in 15 days. The short cycle is usually due to the presence of irritating substances in the uterus. If not bred, she returns the next time at her normal 20-day period. Additional breedings may result in pregnancy, or embryonal death may occur after conception, with alterations in the duration of the estrous cycle.

Example 4 illustrates another cow that is bred and conceives. Delayed embryonal death occurs and the developing corpus luteum of pregnancy prevents the return of estrous periods for a vary-

TABLE 1—Selected Types of Estrous Cycles Observed in Cattle

Example	History	Clinical interpretation
1	E E 20 | - P→ B	Normal estrous cycle; bred; conceived; normal pregnancy.
2	E E E E E 20 | D↓25 | 20 | D↓25 B B	Normal estrous cycle; bred; conceived; (early embryonal death occurred in estrogenic phase of cycle); estrus delayed. Normal estrous cycle; bred; conceived; (early embryonal death occurred in estrogenic phase of cycle); estrus delayed.
3	E E E E E 20 | D↓25 | 15 | 20 B	Normal estrous cycle; bred; conceived; early embryonal death; estrus delayed; short estrous cycle with return to normal.
4	E E E E 20 | D↓ 80 | 20 | - P→ B B	Normal estrous cycle; bred; conceived; (embryonal death somewhat delayed, occurred in luteal phase of cycle). Return to normal delayed; normal estrous cycle; bred; conceived; normal pregnancy.
5	E E E E E 20 | 20 | 20 | 20 B B	Normal estrous cycle; bred; didn't conceive; normal estrous cycle; normal estrous cycle; bred; didn't conceive; normal estrous cycle.

Figures are numbers of days between estrous periods, with a 20-day cycle considered normal.
B = bred at estrus; D↓ = embryonal death; E = estrus; P→ = pregnancy.

ing time—in this case 80 days. She is not bred when she returns to estrus and has a normal 20-day cycle. At the time of the next estrus, she is bred and conceives.

Example 5 illustrates the estrous pattern of a cow with a 20-day cycle. Breeding does not alter the cycle, for no conception occurs.

Other examples could be given which would illustrate the pattern of the estrous cycle associated with endocrine abnormalities or with certain marked disturbances of the tissues of the tubular reproductive tract.

Physical Examination.—After the variations in the estrous cycle have been interpreted clinically, a physical examination is made of each nonbreeding cow. A routine pregnancy examination is a wise step before detailed rectal palpations are carried out for, in our experience, approximately 2 per cent of all cows thought to be infertile will be found pregnant.

If the cow is not pregnant, the vagina, cervix, uterine body and horns, the ovaries and the infundibulum of the fallopian tubes are palpated *per rectum* and alterations in their physical structure and location are recorded. It is possible, by rectal examination, to insert one to four fingers into the cavity of the infundibulum of the fallopian tubes.

The stage of development of the corpus luteum, the amount and type of tone of the uterine musculature, and the size, degree of flexibility, and location of the cervix are recorded and compared with the normal. Any deviation in the inter-relationship of hormone production and the reproductive tract should be recorded.

Next, using a light and a 1- by 18-inch Pyrex glass speculum, the vaginal walls and the external os of the cervix are observed for visible abnormalities. The amount, type, and location of mucus or of pus, if present, are recorded. Abnormalities in the physiological relationship of corpus luteum development, mucus production, uterine muscle tone, and reaction to stimuli are of diagnostic importance. The clinical findings and the conclusions drawn from the breeding history are correlated.

This usually permits a clinical diagnosis, although one may also wish to collect material from the cervical canal or uterus for bacteriological or histological examination. If so, a uterine biopsy instrument (fig. 1) is used for the collection of tissue or mucus. It is somewhat difficult, under field conditions, to collect uterine biopsy specimens.

Uterine Biopsy.—The biopsy instrument (fig. 1), a modification of one devised by

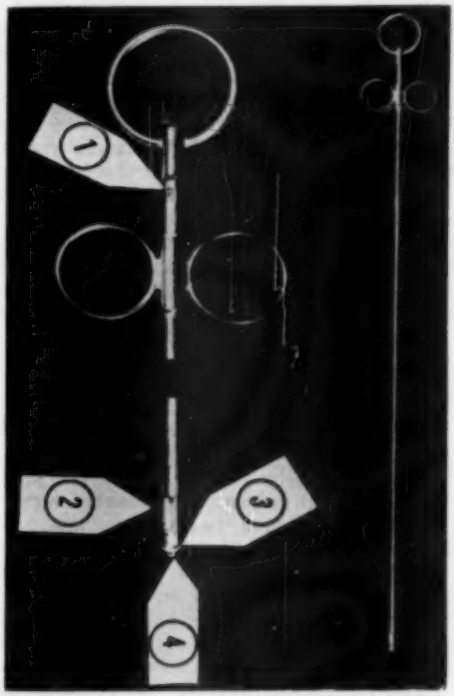


Fig. 1—Uterine biopsy instrument with enlargement of ends (actual size): groove in curette (1) synchronized with cutting part of instrument (2); small circular depression (3) in flat part of head of curette (4) in which cannula recesses while instrument is closed.

Nielsen, consists of a special cannula approximately 20 inches long and 3/16 inch in diameter, which has been milled to cover a curette placed near the end of the contained trocar. The rounded blunt end of the trocar facilitates passage through the cervix and prevents contamination of the curette.

The rectum is emptied and the left hand inserted until the cervix can be fixed by the fingers. Using a 1-inch glass speculum, 10 inches long, to prevent its contamination, the biopsy instrument is passed, in the closed position, through the speculum until the tip is in the vicinity of the vaginal opening of the cervix. With the left thumb locating the external os, the tip of the instrument is moved past the left

thumb and into the cervical canal. The cervix is then threaded over the tip of the instrument.

Once through the cervix, the biopsy instrument is directed up the left horn for 2 to 3 inches, opened, rotated, and closed in such a way that a small piece of the mucosa of the uterine horn is resected and removed, along with any secretions which might be present. This procedure is then repeated in the right horn before the instrument is firmly closed and carefully removed from the reproductive tract.

The instrument is then placed in its autoclaved wrapping paper and taken to the laboratory. There, it is removed from the paper, the exterior is swabbed with sterile cotton dampened in 70 per cent alcohol, the tip is lightly flamed, the instrument then opened, and the contents transferred with sterile tantalum wire loop to selected mediums or to a sterile mortar and pestle.

This biopsy instrument is suitable for the isolation of many bacteria including Brucella or Vibrio.

The main disadvantages are that separate and expensive instruments are required for each cow and that the technique requires practice and the development of skill. One should do his own plating and deliver the plates to the bacteriologist in the laboratory for examination and determination.

The percentage of error with this technique is about 14.

Additional information obtained from biopsy specimens also permits more appropriate treatment and control measures.

Pathology of the Reproductive Tract.—Cows which are sterile or which have irregular estrous periods usually have one or more pathological conditions that are detectable on clinical examination. The lesions may be present in different locations such as in the uterus and cervix, the os uteri alone, in the ovaries or oviducts, or in associated tissues.

By rectal palpation the uterus may be felt to be enlarged to a variable extent. Its walls may be more or less thickened or edematous and the lumen may contain a thick exudate. In most cases, the uterus does not feel as if contents were present. The horns are often asymmetrical in length and, under the stimulus of palpation, they may contract. The muscles of the diseased horn may be especially irritable and contract before those of the healthy horn.

The normal cervix, when visualized by means of a speculum, is cone-shaped and protrudes into the vagina. On its apex is the os uteri. This is usually surrounded by even folds of pink mucosa. Normally, the cervical mucosa is relatively dry and is closed tightly, although a thin strand of clear thick mucus may sometimes be seen coming from the cervix. During estrus, there is a moderate but distinct hyperemia. The os uteri and cervical canal tend to open and an abundant, thin, glassy mucus is discharged.

When inflammation is present, the cervical canal changes position, the direction of portions of the canal deviate from normal and, on passage of a cervical catheter, the instrument may rest on a thickened cervical floor. If the muscular layers of the cervix are involved in the inflammatory process, the cervix becomes longer and thicker and, on rectal examination, it feels hard and relatively inflexible. The mucosa surrounding the vaginal opening of the cervix may swell and form even, radiating ridges, but it usually becomes irregular in contour. The locations of the irregularities depend on the major sites of swellings.

The folds of the mucosa forming the external os of the cervix are usually arranged radially and form a ring in the middle of which the edematous, thickened mucosa of the posterior portion of the cervical canal protrudes. An exudate having an abnormal volume, consistency, or appearance may be observed. The exudate may be mucoid or purulent. Flakes of pus may be present in a fairly clear mucus. Diseases of the cervix and uterus associated with exudation are almost always due to an infection with pus-producing microorganisms.

Diagnosis of nonspecific infections, in most instances, can be made by evaluating the clinical findings against a background of information obtained from the history of the herd but, at times, laboratory assistance may be necessary. Most nonspecific infections are not highly contagious, although certain organisms may be spread by copulation. In Illinois, approximately 80 per cent of all breeding failures can be demonstrated to be due to a catarrhal inflammation of the uterus or cervix, or both. Many of these animals have various microorganisms in their uterus. The healthy

bovine uterus is essentially free of bacteria.

TREATMENT

Before the schedule of treatment for infertility is chosen, the clinician should critically evaluate the possible effect of the livestock husbandry practices, the breed of cattle, the type of breeding program, and the degree and location of tissue changes.

Treatments have been aimed at destruction of the microorganisms present, on the theory that the removal of these infectious agents, if only for a time, would improve the chances of conception and permit the embryo to begin its development under more favorable nutritive conditions. Antibiotics alone and in various combinations have been used by intrauterine infusion for this purpose. Endocrine products such as diethylstilbestrol, estradial benzoate, and ECP* have been widely used, by intramuscular injection, to increase the local blood supply and to stimulate muscular and glandular function of the tubular reproductive tract.

Increased muscular and glandular activity improves the ability of the uterus and cervix to recover from disease. Attempts to improve local blood supply and, at the same time, to dilute and remove irritants have been the rationale behind the use of antiseptics and hypertonic solutions. In addition, they destroy most or all of the bacteria present. Nonspecific infections can be successfully treated but failure of the cervical barrier may permit ready reinfection.

The antibiotics and antiseptics currently used for intrauterine injections are usually effective in the treatment of streptococcic and staphylococcic infections. However, many diphtheroids are resistant to the antibiotics usually used. Systemic treatment is sometimes successful in many staphylococcic and streptococcic infections.

Staphylococci, streptococci, and diphtheroids are responsible, in our experience, for approximately two thirds of the nonspecific infections of the uterus and cervix. Other organisms may occur alone or in various combinations.

The choice of drugs used for treatment depends on the type of organism present and the duration and extent of the tissue changes. When uterine infusions are used, the volume of fluid injected may vary with the intent of the clinician, the drug or drugs used, the stage of the estrous cycle, and the size of the uterus.

Some clinicians use oil-base solutions such as 2.5 per cent hexylresorcinol or emulsions such as 30 per cent sulfanilamide in oil. Other veterinarians prefer water suspensions such as 10 per cent sulfadiazine. Water is also the usual solvent for various antiseptics and antibiotics prepared for intrauterine infusion. Where economy is important, 5 per cent sodium chloride solution or 10 per cent magnesium sulfate solution has been infused into the uterus. Glycerol, 20 to 40 cc., has also been used as an intrauterine infusion for its hygroscopic and antiseptic action.

Many drugs, other than those mentioned, have been used by clinicians in the treatment of uterine and cervical disturbances. We usually employ a modified Nielsen catheter when administering uterine injections and infuse 20 to 150 cc. of the drug and solution chosen.

The drugs used may also vary with the stage of the estrous cycle and the objective of the treatment. For example, when animals with uterine infections are in early estrus, the uterus may be infused with 30 cc. of sterile distilled water in which has been incorporated 100,000 units of penicillin and 0.5 Gm. of streptomycin. Breeding is then delayed for a few hours.

If the animals are to be bred during estrus and treated in the postestrous period, an infusion of 0.5 Gm. of one of the broad-spectrum antibiotics in saline solution (1 to 5%), or in dextrose solution (6 to 10%), may be used. Lugol's solution (4%), tyrothricin (0.5 to 1.0 mg./cc.) in distilled water, or one of the sulfonamides such as sulfamerazine solution (12.5%) have also been used.

Postbreeding uterine infusions may be indicated and can be carried out satisfactorily for a number of days, but we usually perform the uterine injection at two to five days postestrus.

Where infertile animals in various stages of the estrous cycle are treated as a group before being bred, about 35 per cent of those treated will conceive in the first or second post-treatment estrous periods. Re-treatment will usually permit an additional 35 per cent or so to conceive. Where specific treatments based on bacte-

*ECP is estradiol-17, cyclopentylpropionate, produced by Upjohn and Co., Kalamazoo, Mich.

riological and clinical examinations are employed in infertile animals, the conception rate with one or two treatments can approach 80 per cent.

CONCLUSIONS

Diagnosis of nonspecific infections of the bovine cervix and uterus through clinical examinations can be made with reasonable certainty.

Accuracy of diagnosis and effectiveness of treatment can be improved by the use of biopsy specimens suitable for bacteriological and histological examinations.

Herd and individual histories are often helpful when available.

Treatment is usually aimed at the stimulation of the reproductive tract, either by the use of hormones or by the use of uterine injections of hypertonic solutions, or mild irritant antiseptics, such as 4 per cent Lugol's solution, 5 per cent sodium chloride solution, 10 per cent magnesium sulfate solution, glycerol, hexylresorcinol in oil, or tyrothricin solutions.

At times, the objective of treatment may be the freeing of the uterus of bacteria. For this purpose, many clinicians use intrauterine infusions of one or more of the antibiotics such as penicillin, streptomycin, Terramycin, Chloromycetin, Aureomycin, or Tyrothricin. A sulfadiazine suspension or a sulfamerazine solution have also been used with good clinical results, either alone or in various combinations with antibiotics.

References

[1]Albrechtsen, J.: The Sterility of Cows, Its Causes and Treatment. Alexander Eger Co., Chicago, 1917.

[2]Bang, B. and Stribolt, V.: Die Aetiologie des seuchenhaften ("infektiösen") Verwerfens. Deutsche Ztschr. Thiermed. Neue Folge. 1. (1897): 241-278.

[3]Nielsen, F.: Researches Concerning the Aeteologic and Pathogenesis of Sterility in Dairy Cows. N.V.M.A. (Dublin Congress) Handbook (1926): 199-267.

[4]Williams, W. L.: The Diseases of the Genital Organs of Domestic Animals. 3rd ed. Published by the author, Ithaca, N.Y., 1943.

Cows in U.S. Rank Ninth in Milk Production.—The Netherland cows lead the world in annual average milk production (8,602 lb.), followed by those in Belgium, Denmark, Luxemburg, Switzerland, Sweden, Great Britain, and Germany. Our average is tied with that of Iceland (5,808 lb.) for ninth place. However, cows in some state dairy herd improvement associations average more than 10,000 lb. of milk. —*Prairie Farmer (April 5, 1958): 47.*

Cattle and Beef Imports

Importation of cattle and calves into the United States was much higher in 1957 (727,853) than for more than ten years. The 1937 to 1941 average was 619,705, with about 40 per cent from Canada, 60 per cent from Mexico, and only about 800 head from other sources. Because of aftosa, no cattle were imported from Mexico from 1948 through 1951, and again in 1954, with importations from Canada rising to about 460,000 during three of those years. However, when aftosa appeared in Canada in 1952, total imports from both countries dropped to 140,461. In 1956, total imports were still only 159,365 so they more than tripled in 1957. The most important feature in 1957 was the increase in importation of boneless beef from New Zealand, Canada, Ireland, and Australia.

United States tariff rates on calves up to 200 lb. are 1.5 cents per pound on the first 200,000 head imported, then 2.5 cents/lb. The tariff rate is the same on cattle weighing more than 700 lb., the increased rate coming after 400,000 head have been imported. For cattle weighing 200 to 700 lb., the rate is uniformly 2.5 cents/lb. The rate for dairy cows is 1.5 cents/lb., but cattle imported for breeding purposes, only, are free of duty. The rate on butchered beef and veal is 3.0 cents/lb., and on canned beef it is 20 per cent of the foreign value.

In 1957, the value of our cattle exports was $12 million compared with $70.9 million for imports.—*Am. Cattle Prod. (April, 1958): 9.*

Six calves were successfully immunized against leptospirosis, virus diarrhea, and infectious bovine rhinotracheitis with a single inoculation of a combined vaccine.—*Cornell Vet. (April, 1958): 207.*

Purebred Livestock Registrations

In 1957, the number of animals registered with the various leading livestock breed associations were as follows:

Beef Cattle.—Hereford, 430,951; Aberdeen Angus, 185,213; Polled Hereford 95,596; Shorthorn, 44,590; Brahman, 15,276; and Polled Shorthorn, 13,960.

Dairy Cattle.—Holstein-Friesian, 212,445; Guernsey, 75,899; Jersey, 68,403;

Brown Swiss, 20,861; Ayrshire, 19,238.

Swine.—Duroc Jersey, 60,146; Hampshire, 53,797; Landrace, 23,571; Yorkshire, 20,064; Poland China, 20,019; Berkshire, 17,517; Spotted Poland China, 14,972; and Chester White, 13,350.

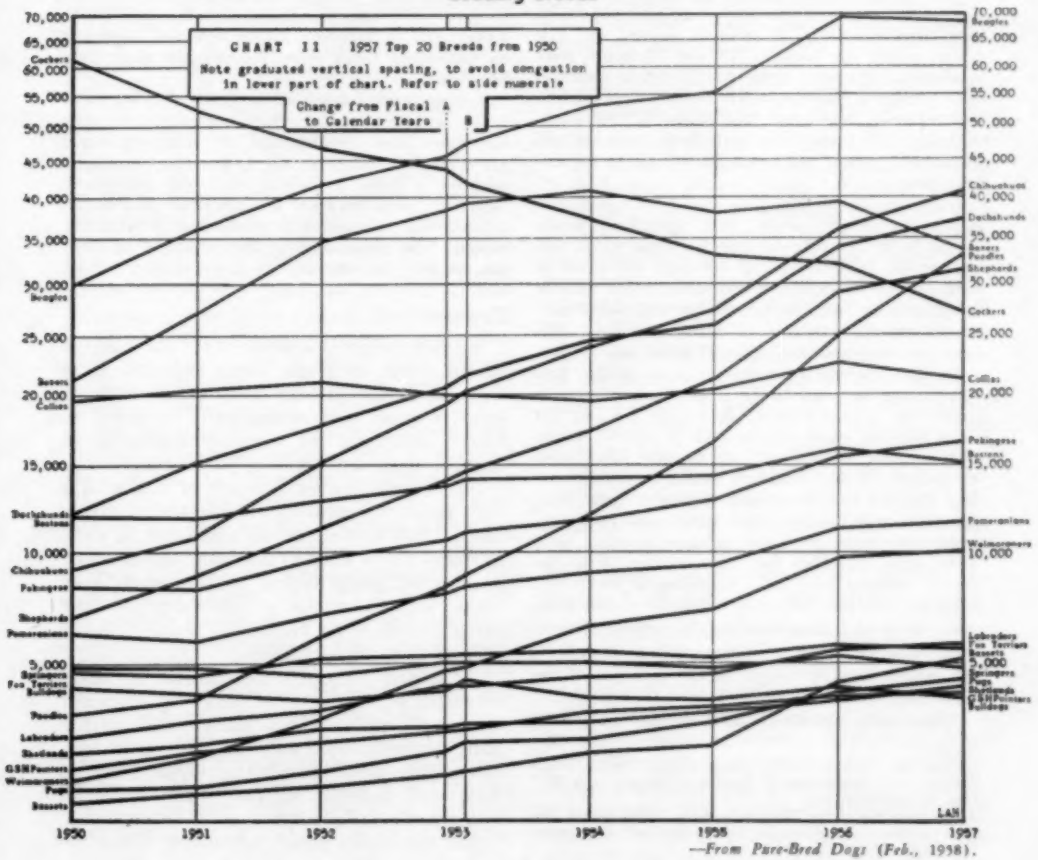
Sheep.—Suffolk, 34,595; Hampshire, 32,696; Corriedale, 17,960; Southdown, 10,353; Shropshire, 9,670; Rambouillet, 8,067; Columbia, 7,602; Dorset, 5,467; Cheviot, 4,850; Montadale, 2,095; and Oxford Down, 2,048.—*Breeder's Gaz. (April, 1958): 20.*

Popularity of Canine Breeds

Shifts in the popularity of various breeds of all species are always of interest. Therefore, the following are reported. The canine breed registration chart shows the relative changes in the number of dogs registered in the 20 leading breeds from 1950 to 1957. During the last year the percentage shift of the top ten breeds was: Beagles, −1.5; Chihuahuas, +12.4; Dachshunds, +9.5; Boxers, −15.4; Poodles, +32.8; German Shepherds, +7.8; Cocker Spaniels, −15.6; Collies, −6.8; Pekingese, +6.4; and Boston Terriers, −3.1 per cent. —*Pure-Bred Dogs (Feb., 1958): 9-11.*

In dogs, the larger breeds tend to have shorter life spans—the Great Dane or Saint Bernard of 10 is a veteran while many of the smaller breeds average 12 to 15 years.—*Dog World (April, 1958): 19.*

Chart 1—Relative Changes, from 1950-1957, in the Number of Dogs in the 20 Leading Breeds



—*From Pure-Bred Dogs (Feb., 1958).*

Eastern Equine Encephalomyelitis in Pheasants

R. E. KISSLING

Montgomery, Alabama

THE LABORATORY DIAGNOSIS of eastern equine encephalomyelitis (EEE) in pheasants may be accomplished either by isolation of the virus or by demonstration of specific antibody. Virus isolations afford more convincing evidence of current infection than do serological procedures, since it is more difficult to determine the time of infection by antibody studies.

ISOLATION AND IDENTIFICATION OF THE VIRUS

The isolation of EEE virus may be accomplished by the use of a variety of hosts. For economic reasons, these hosts are usually limited to mice, chicken embryos, or tissue cultures. Embryonating eggs are susceptible to infection with EEE virus by any route of inoculation. However, the intra-amniotic route in 12- to 15-day-old embryos is the most sensitive route. If virus is present, the embryos should die between 18 and 72 hours after inoculation. Embryos dying of EEE virus infection will present a purplish color, due to hemorrhages and extreme congestion. The fluids will be clear. Although all membranes and fluids will contain virus, the greatest concentration will be in the embryo proper.

Identification of the virus may be accomplished either by neutralization with specific immune serum or by complement fixation. Since virus concentrations in the range of 10^9 $l.d._{50}$ per gram of embryo may be expected, it is usually not feasible to prepare an immune serum that will completely neutralize the amounts of virus found in concentrated suspensions of infected embryos.

In the interests of economy, a screening procedure may be used in the neutralization tests by combining approximately 100 to 500 $l.d._{50}$ of the virus with an equal volume each of normal serum, EEE immune serum, and one or two other types of immune serums (western equine encephalomyelitis (WEE) and Newcastle disease). These combinations may be inoculated either into mice, embryonating eggs, or tissue cultures, using 5 or 6 mice, eggs, or tubes for each mixture. Since infected embryos have $l.d._{50}$ endpoints at about 10^{-8} $l.d._{50}$ per 0.1 ml., one may routinely screen these embryos at 10^{-6}, thus avoiding the necessity for repeat tests. However, if more accuracy is desired, the isolate may be titered in the presence of the respective serums.

Tissue cultures may be used for the isolation of EEE virus. Either chicken embryo cultures or hamster kidney cultures prove satisfactory. Tissue cultures are slightly less sensitive than chicken embryos to EEE and WEE viruses. The virus yield from infected tissue cultures is somewhat less than from chicken embryos, with yields of 10^8 $l.d._{50}$ (or $TCID_{50}$) per milliliter to be expected.

Mice are slightly less susceptible to infection with EEE than either chicken embryos or tissue cultures, but offer the advantage of being able to tolerate a considerable amount of bacterial contamination of the inoculum. Mice are most susceptible when inoculated intracerebrally (i.c.).

The serological diagnosis may be made either by neutralization or hemagglutination-inhibition tests.

Neutralization tests may employ any of the susceptible hosts. Since neutralizing antibody will persist for long periods, it is not advisable to rely on serological tests for diagnosis in flocks of older birds, such as breeders, unless repeated bleedings on individual birds show increases in neutralization titer.

Hemagglutination-inhibition (HI) tests are more rapid and economical than neutralization tests but have the disadvantage of requiring rigid pH control. In addition, the preparation of antigen requires a rather laborious extraction procedure. However, once reagents are prepared and standardized, the manipulation of the test is relatively simple. The persistence of HI antibody in birds has not been determined.

EPIDEMIOLOGY

Epidemiological studies place the habitat of the virus in fresh water swamps. It is in these areas that the virus smolders from year to year and occasionally emerges to cause epidemics of varying intensity in horses, man, or captive pheasants.

The normal infection cycle of EEE within the swamps involves transmission from mosquitoes to wild birds and back to mosquitoes. Since both gregarious and solitary species of birds living in the same area show similar rates of antibody to EEE virus, there is no reason to suspect direct bird-to-bird transmission.

A varied mosquito population in these swamps, having a wide range of efficiency as vectors of the virus, allows for a rather slow transmission rate of the virus and, therefore, survival of the virus since it does not quickly exhaust the supply of susceptible vertebrates.

On the other hand, when the virus be-

From the Communicable Disease Center, Public Health Service, U.S. Department of Health, Education, and Welfare, Montgomery, Ala.

Presented before the Poultry Section, Ninety-Fourth Annual Meeting, American Veterinary Medical Association, Cleveland, Ohio, Aug. 19-22, 1957.

comes introduced into salt marsh areas where large populations of only a few species of mosquitoes are found, but which are efficient vectors of EEE virus, epizootics among the birds flare up and horses and man become involved. This situation usually is self-limiting, leaving no susceptible vertebrates, and the appearance of virus in the same area is not likely to occur until several years have elapsed.

When pheasants are raised in captivity, they are by necessity kept under artificial conditions and it follows that the spread of an infectious agent may also assume unnatural methods. The infection of the first pheasant may be by the bite of an infected mosquito. Direct pheasant-to-pheasant transmission then occurs, associated with cannibalistic vices.

Serological surveys of human beings living close to infected pheasant flocks indicate a low rate of contact with EEE virus (1% with specific antibody). This rate is no greater than in individuals living in other enzootic areas where pheasants are not raised in captivity.

VACCINATION INVESTIGATION

Since the eradication of EEE from the wildlife sources which infect pheasants is impractical, the control of the disease depends either upon preventing the contact with mosquitoes or immunization of the birds before the epidemic season. Immunization seems more logical than mosquito control since, after the original mosquito-infected case, the disease may spread among the pheasants in the absence of these arthropods.

We have made a small pilot study comparing formolized vaccine with a modified live virus as immunizing agents. The formolized vaccine was of chicken embryo origin and was prepared by the Army for use in man. The modified virus had been grown through 50 serial passages in deembryonated eggs and had lost its capacity to produce disease in mice by subcutaneous inoculation, although it immunized them. Following i.c. inoculation, the incubation period was lengthened from the usual two to three days to five to seven days.

Each vaccine was administered subcutaneously to 10 pheasants, 14 weeks old. Four pheasants were given 6,000 mouse i.c.l.d.$_{50}$ of EEE virus, prepared by only two mouse brain and one chicken embryo passage. The inoculated birds were given either 12,000,000 mouse i.c.l.d.$_{50}$ or 0.2 ml. of the formolized vaccine. Blood samples were collected on each of the five days following administration of the vaccine and tested in mice for the presence of virus.

RESULTS

None of those given the formolized vaccine showed virus in their blood during this period. Of the 10 birds given the modified virus, 8 showed a viremia during the first three days in from one to all three blood specimens. The maximum virus titers of the blood in this group varied from $10^{0.3}$ to $10^{4.8}$ l.d.$_{50}$. The 4 birds given early passage virus circulated virus for two to four days following inoculation, with maximum titers between $10^{2.8}$ and $10^{5.3}$ l.d.$_{50}$. No signs of the disease occurred in any of these birds during the ensuing 34 days.

Thirty-four days after vaccination, blood samples were taken for serological tests from all vaccinated birds, plus 10 previously uninoculated pheasants. The birds were then challenged i.c. with 12,000 mouse l.d.$_{50}$ of EEE virus in the form of naturally infected pheasant brain.

All 10 of the control birds became ill and 7 died as the result of EEE infection. Of the 9 birds given formolized vaccine, 8 became ill and 3 died. None of the 10 given modified virus nor the 4 birds given early passage virus became ill. Blood samples from all birds were tested for viremia at 24 and 72 hours after inoculation. Each of the birds given the formolized vaccine and each of the control birds had a viremia at 24 hours. At 72 hours, 1 of the formolized vaccine group and 3 of the control group still had virus in their blood.

Serum from each of the birds given the modified virus and the 4 given early passage virus contained neutralizing antibody to EEE virus at the time of challenge. The birds given the formolized vaccine and the control birds had no demonstrable neutralizing antibody at that time.

CONCLUSIONS

Although the number of pheasants used was small, the indications are that a single dose of formolized vaccine may afford some protection; the mortality rate in that group was somewhat lower than in the control group. The modified virus definitely immunized the pheasants. However, in view of the viremia titers above 10^3 l.d.$_{50}$

which were produced in 3 of the 10 birds, it is not yet safe for use, since certain mosquitoes may be able to become infected on blood containing that amount of virus.

Either the virus found in Louisiana is less virulent for pheasants than that found in New Jersey or repeated pheasant passage may increase its virulence for pheasants.

"Visna," a Nervous Disease of Sheep

A transmissible disease of sheep, in Iceland, called "visna," develops slowly and affects the central nervous system. Pleocytosis (an increase in lymphocytes in the cerebrospinal fluid) usually begins one to three months after intracerebral inoculation and persists for many months, up to two years.

Some sheep develop progressive paralysis as late as two years after inoculation. In others, pleocytosis regresses without signs of illness.

The characteristic lesion is demyelination in the brain and cord. The disease was once reproduced by intracerebral inoculation of a filtrate. This disease differs clinically and histologically from scrapie.—*Vet. Bull. (Feb., 1958): Item 426.*

Two Hemoglobin Components of the Chicken.—Blood samples of 50 chickens were examined by paper electrophoresis which showed one hemoglobin component with a low mobility and a second, which composed 15 per cent of the total hemoglobin, with a much higher mobility. The two components could be separated by chromatography. Component I contained much more of the basic amino acids (glycine, histidine, and arginine), while component II contained more amino acids. Both components are completely different from any human hemoglobin.—*Science (April 4, 1958): 762.*

Control of Coccidiosis in Calves and Chickens with Chlortetracycline.—Six young calves quickly recovered from acute coccidiosis, in Russia, when given chlortetracycline orally (20 mg/kg. of body wt.) two or three times a day for three to four days. Chickens responded likewise to 3 to 6 mg. for three or four days. After three days, the treatment should be repeated.—*Vet. Bull. (Feb., 1958): Item 401.*

Epidemiology of Toxoplasmosis

Since toxoplasmosis is often recognized in newborn infants, while the mother shows nothing except a reaction to tests, the following case report is of interest.

A Negro infant died of toxoplasmosis and all members of its family reacted to the serological tests. By injecting brain tissues of neighborhood animals into white mice, Toxoplasma were isolated from 7 of 35 cats, 2 of 3 ducks, 3 of 7 chickens, 1 of 16 pigeons, and 7 of 121 mice.

Toxoplasmosis, therefore, should be regarded as a zoonosis in which man is only one of several vertebrate hosts.—*J.Am.M.A. (March 15, 1958): 1399.*

Toxoplasmosis in Mink

In recent months, toxoplasmosis has been diagnosed in mink on six ranches in Ontario, on the basis of histopathological changes in sections of the brain, serological tests, and isolation of the organism by mouse inoculations. Toxoplasma were found in the brain, liver, intestines, pancreas, and lung sections of affected animals. The mortality was up to 100 per cent. —*T. J. Pridham and Joan Belcher in Canad. J. Comp. Med. and Vet. Sci. (March, 1958): 99.*

Ecology of Equine Encephalomyelitis

Studies of eastern equine encephalomyelitis in wild birds shows two patterns of activity.

The first appears to be a progression of the virus through a wild bird population at a normal enzootic maintenance rate. Under these conditions, the virus was isolated from less than 1 per cent of the birds and 13 to 22 per cent possessed neutralizing antibodies. There was little or no human or equine involvement. Such a level of activity would seem to favor the continuance of the virus.

In the second pattern, the virus seemed to spread through the wild bird population with explosive speed, even English sparrows and pigeons being involved. The virus was isolated from 11 per cent of the birds and antibodies were present in 45 to 54 per cent. Horses were always involved in epizootic proportions and the infection often occurred in man.

It seems logical that maintenance depends upon a sufficiently susceptible bird

population and an appropriate density of both birds and transmitting vectors. These balances may be upset by great increases either in birds or vectors, resulting in epizootic situations. Eradication of the virus in such habitats seems impossible or impractical.—*Am. J. Pub. Health (March, 1958): 328.*

Mucosal Disease in Iowa

Mucosal disease was first recognized in January, 1951, in Iowa. It was diagnosed in 41 animals in 12 herds in 1951; in 139 animals in 22 herds in 1953; and in 124 animals in 50 herds in 1957, with the totals varying between these extremes in intervening years.

It should be suspected when the animal is between 6 and 18 months old, completely refuses feed, often drinks large quantities of water, usually has a normal temperature and a persistent diarrhea, often with tenesmus, and has a lethargic attitude. One third of the animals show no oral or eye lesions and the course usually is of four to ten days' duration. It must be differentiated from urethral calculi which may cause straining, and from diarrhea caused by coccidiosis.

The herd mortality may be from 1 to 50 per cent but the case mortality is close to 100 per cent, regardless of treatment.—*F. K. Ramsey et al. in Iowa State College Vet., No. 2 (1958): 101.*

Two Uses of Tranquilizers for Livestock.—Ewes which had lost their lambs and had plenty of milk were given 1 to 2 cc. of a tranquilizer (Trifalon by Schering). The effect lasted long enough so that they did not abandon their foster lambs.

Also, at weaning time, 49 of 152 calves were given reserpine with a balling gun (1 mg./lb. of body wt.). In an hour, when the drug became effective, the treated calves were quiet, easily handled, and ate well, while the control calves bawled and "paraded" the fences. After 39 days, the treated steers had gained an average of 7.1 lb. more than the controls.—*Farm J. (April, 1958): 65.*

Tranquilizing Chickens.—Groups of 20 young male Leghorn chickens were given either meprobamate (Miltown) or promazine hydrochloride (Sparine), 125 or 250 mg. per pound of ration. These agents were ineffective in calming the chickens, even though at these levels they seemed slightly toxic as indicated by the failure of these birds to gain as well as the controls.—*Poult. Sci. (Nov., 1957): 1386.*

Synergistic Action of *Gamma* Globulins and Antibiotics

Reports indicate that a combination of *gamma* globulins with antibiotics, particularly with chloramphenicol, have been extremely effective in the treatment of experimental infections in mice, whereas the same doses of each agent, when used separately, were incapable of controlling these infections. Similar therapeutic results were obtained clinically, provided the *gamma* globulin was obtained from blood which contained antibodies against the disease. This is particularly true against diseases caused by streptococci, micrococci, pneumococci, and the viruses of measles, hepatitis, and poliomyelitis, but not against Salmonella infections.

The *gamma* globulins exert their action only on those pathogenic agents which are present in the extracellular spaces, but they exert a notable neutralizing effect on the bacterial toxin. The mechanism of the synergistic action has not been completely elucidated.—*J.Am.M.A. (March 1, 1958): 1102.*

Rabies in Bats, Moles, and Cattle.—An atypical form of rabies, characterized by excessive docility, occurs in cattle in northeastern Yugoslavia. Rabies virus has been found, locally, in the brains of 4 insectivorous bats (*Nyctalus noctula*) and in the brains of 2 of 30 moles, but brains of 60 field mice were negative. The moles and bats may acquire the virus from eating the larvae and adults of a burying beetle which lives on carrion. However, the bats may not play a role in the epizootiology of rabies in Europe since the virus is passive and present only in their brains.—*Vet. Bull. (Feb., 1958): Item 412.*

Aujeszky's Disease.—During a two-year period, Aujeszky's disease occurred in 14 villages in Slovakia and was diagnosed in 75 unweaned pigs, 4 dogs, and 1 cat. The virus was also isolated from rats found dead in the piggery.—*Vet. Bull. (March, 1958): Item 750.*

Surgery and Obstetrics
and Problems of Breeding

A New Method of Fracture Fixation Using the Modny Nail

EDWARD GARNER, D.V.M.

Maplewood, New Jersey

INTRAMEDULLARY NAILING, introduced in 1940,[6] is now used frequently in the open reduction and fixation of fractures.[11,12]

Several varieties of nails and pins have been employed, as well as various techniques for insertion.[1-5]

Recently, a new type of intramedullary nail was introduced[7-9] which possesses several advantages. The Modny nail, unlike other intramedullarly nails, can be inserted through a single incision and transfixed at various levels by screws.

On cross section, the Modny nail resembles an x beam and its axis is perforated by a series of small holes (fig. 1) designed for levering and transfixation. Made of 18-8 SMO alloy, this nail possesses marked rigidity. Tests made in a metallurgic laboratory proved the nail to be stronger than a similar segment of the Kuentscher nail.[9]

Up to the time of this report, it has been used only in fractures in man.

TECHNIQUE FOR FEMORAL REDUCTION

Preoperatively, the width and length of the medullary canal is determined by radiographs in order to gauge the proper size of nail to be used. This is accomplished by taping an x-ray measuring rod to the fractured extremity at the same plane as the fractured bone. After the radiograph is developed, a caliper is used to measure the width of the medullary canal. The width is then compared to the grooved measuring rod.

To insert the rod, the animal is anesthetized and a short incision is made over the fracture site. The fractured bone is exposed and the longer fragment is mobilized and held with a pair of bone forceps and a hole is drilled through the cortex near the fracture line, through which to manipulate the nail (fig. 3). Or, a bite with a rongeur forceps may be taken from one end of the bone fragment to form the aperture.

In order to obtain a proper fit of the nail in the marrow cavity, it may be necessary to enlarge the cavity with a drill. This helps correct improper angulation and assists levering the nail into position. The gentle insertion resulting is in contrast to the technique of hammering the ordinary nail into position.

The Modny nail is inserted into the marrow cavity of the longer bone fragment (fig. 2), the fracture ends are apposed, and reduction is accomplished. The nail is then levered into position across the fracture site (fig. 3) by inserting a lever through the hole in the cortex or at the fracture site and engaging the holes in the nail, and levering it into position. To center the nail across the fracture site, the holes are counted as they pass the fenestration in the bone.

A small bone screw (human metacarpal screw) is inserted through one of the nail holes, engaging the cortices on both sides of the bone (fig. 4). The screw then acts as a "cross bolt," preventing migration or wandering of the intramedullary nail. The wound is closed in the usual manner.

In some comminuted fractures, the nail can be manipulated through the fracture opening. A large comminuted fragment can be replaced and fixed by a bone screw (fig. 4).

In transverse fractures of the femur, torsion after fixation is less likely with the Modny nail, because of the four fins, than with other pins. Also, screws may be placed in both ends of the Modny nail, fixing the bone with an effect similar to that of bone plate. However, this method is not recommended since it does not allow for compression of the bone ends at the fracture site.

CASE REPORTS

Case 1.—A male German Shepherd, 3 years old, had a midshaft fracture of the right tibia and fibula (fig. 5 a). The Modny nail was introduced and transfixed with a metacarpal screw (fig. 5 b). The dog did not bear weight on the injured leg for almost two weeks. However, five weeks after the operation, it was able to bear weight normally (fig. 5 c taken at 6 weeks).

Case 2.—A male German Shepherd, 9 months old, had a spiral midshaft fracture of the left femur; it was reduced with the Modny nail and transfixed with a meta-

Dr. Garner is a small animal practitioner in Maplewood, N.J.

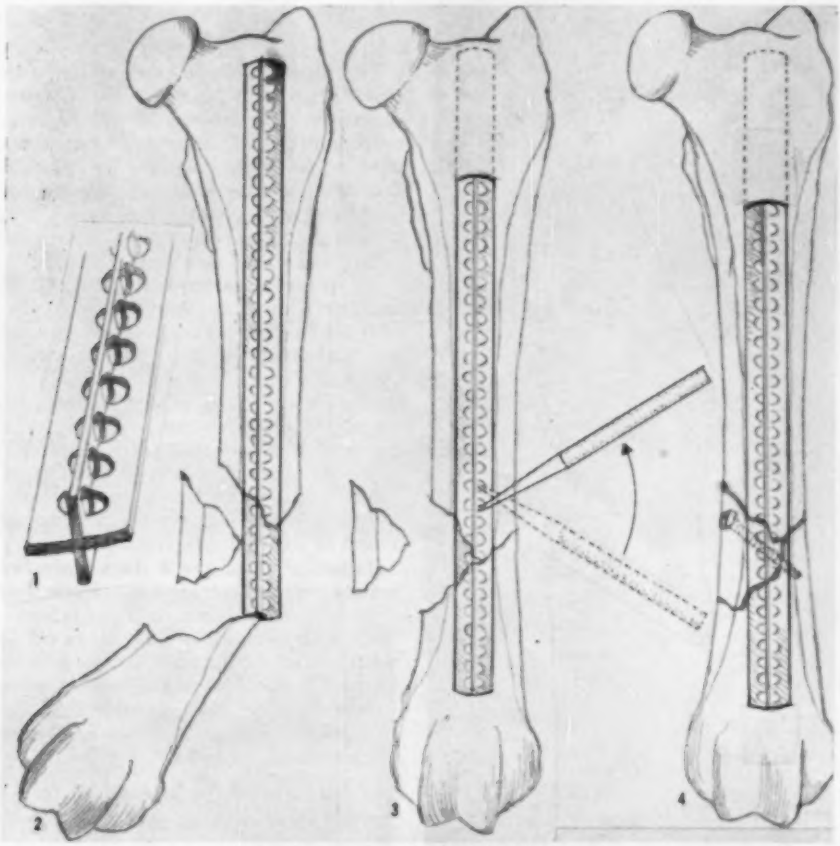


Fig. 1—Cross section sketch of the Modny nail.

Fig. 2—Insertion of the Modny nail into the major fragment of a fractured bone.

Fig. 3—After the Modny nail is inserted, the fracture is reduced and the minor fragment maneuvered into place.

Fig. 4—The comminuted fragment is then replaced and transfixed with a small bone screw that acts as a "cross bolt."

carpal bone screw (fig. 6 a). Two weeks postoperatively, because of a draining sinus at the site of the incision, penicillin was given for three days and the sinus closed. Three weeks postoperatively, a radiograph (fig. 6 b) revealed that the screw had migrated into the muscle, probably because it was too short and had not engaged the opposite cortex of the bone. The dog was walking with a slight limp, but was able to run and jump.

Case 3.—A male mixed Terrier, 1 year old, had a transverse fracture of the left femur. The Modny nail was inserted and a small piece of Kirschner pin was used as the "transfixing bolt." The protruding end was bent parallel to the bone and fixed to it with a wire suture (fig. 7).

The dog placed weight on the leg one day postoperatively. When discharged three days later, it walked with a slight limp. Two weeks later, a radiograph showed that motion of the "transfixing bolt" had again occurred, but with no migration of the Modny nail. (In man, an ordinary bone screw is used and migration of the screw has not been reported.[10]) We have used the Modny nail in 3 other animals, with good results in all.

Discussion

The Modny nail, in conjunction with the transfixing screw, can be used in fractures at extremities of bones as well as in spiral or comminuted fractures. It has also been used successfully, in man, in comminuted fractures at the shaft extremities.[9,10] To avoid migration, which has been a problem with various nails, it can be "cross bolted" either above or below the fracture.

In femoral fractures, the end of the nail may be allowed to protrude from the trochanter by retrograde insertion, in the manner of other pins, thus allowing for extraction of the nail if desired.

The Modny nail should be cross-bolted on one side of the fracture only, so it will not act as an internal plate, thus delaying union as absorption occurs at the fracture site.

In our limited experience, this method of fracture fixation has resulted in early ambulation. Five of the 6 dogs were bearing weight on the fractured leg at one week.

It is possible that intramedullary nailing, with subsequent rapid mobilization, would offer advantages for large animals. In race horses, early ambulation following intramedullary nailing with the Modny nail might result in salvage of the animal for breeding purposes.

Conclusions

The advantages of the Modny nail type of fixation are:

1) The Modny nail requires only a single incision over the fracture area. No counter incision is needed for insertion.

2) It does not extend beyond the marrow cavity, in normal use.

3) "Wandering" is eliminated by the cross bolt.

4) It may be used in comminuted or spiral fractures.

5) The cruciate shape of the nail results in a minimum encroachment on the marrow cavity.

The disadvantages of this type of fracture fixation are:

1) Removal would be difficult, if that

« «

Fig. 5—Radiograph showing the medial view of a midshaft fracture of the right tibia and fibula of a German Shepherd (a); fracture reduced with the Modny nail and transfixed with a metacarpal screw, posteromedial view, taken two days postoperatively (b); six weeks postoperatively, medial view (c).

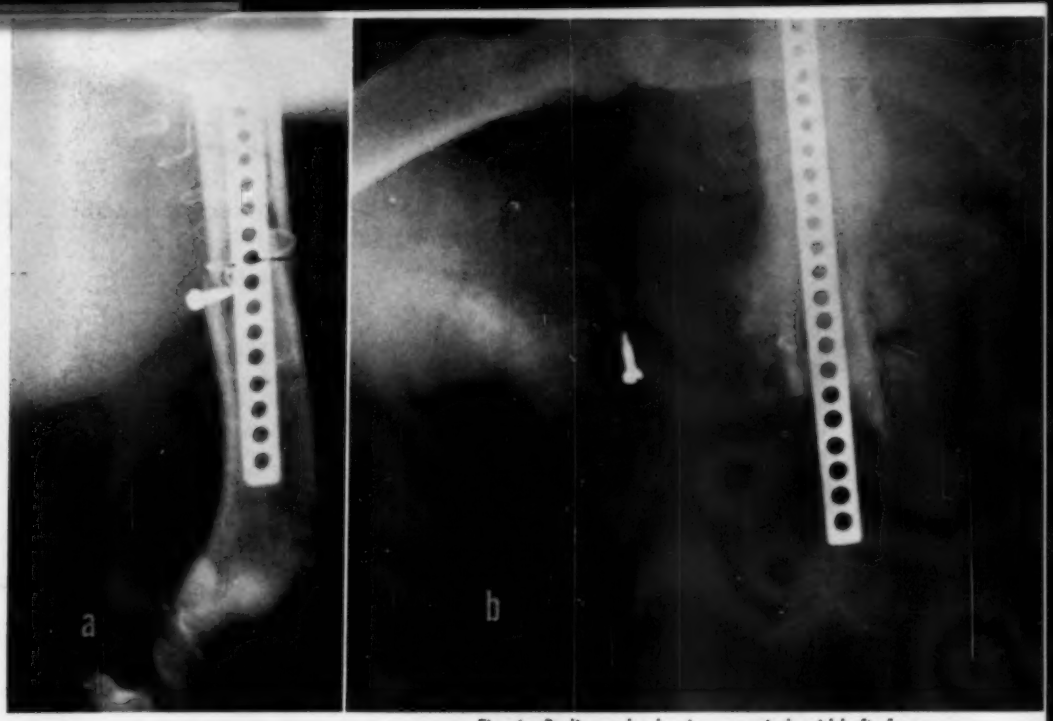


Fig. 6—Radiograph showing a spiral midshaft fracture of the left femur of a German Shepherd, reduced with the Modny nail and transfixed with a metacarpal bone screw; notice the poor purchase of the transfixing screw (a); three weeks postoperatively there is good callus formation and union is well advanced; the nail has not moved from its original position—notice migration of the transfixing screw (b).

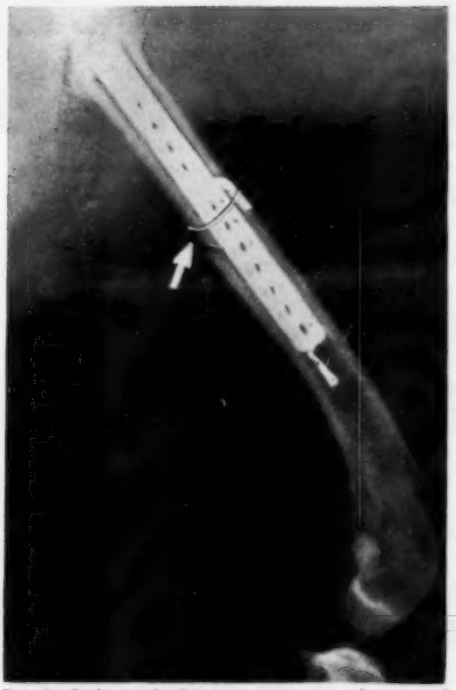


Fig. 7—Radiograph showing a transverse fracture of the left femur of a male Terrier. The Modny nail was inserted and a small piece of Kirschner pin was used as the transfixing bolt. Arrow points to wire (touched-up) encircling shaft of bone and transfixing pin.

became necessary. Should union not occur, the nail could be levered into the longer fragment, the fracture displaced, and the nail removed in this manner.

2) It is not recommended in compound fractures.

References

[1]Bernard, B. W.: Method of Repair of Femoral and Humeral Fractures. J.A.V.M.A., *113,* (Aug., 1948): 137.

[2]Brinker, W. O.: Panel Discussion on Fracture Fixation. J.A.V.M.A., *116,* (April, 1950): 286.

[3]Brinker, W. O.: Fractures, Canine Surgery. American Veterinary Publications, Inc., Evanston, Ill. (1952): 548-643.

[4]Jenny, J.: Kuentscher's Medullary Nailing in Femur Fractures of the Dog. J.A.V.M.A., *117,* (Nov., 1950): 381.

[5]Jonas, S.: A New Method of Intramedullary Pin Fixation. J.A.V.M.A., *115,* (July, 1949): 9.

[6]Kuentscher, G.: Die Marknagelung von Knochenbruchen. Arch. klin. Chir., *200,* (1940): 443.

[7]Modny, M. T.: The Perforated Cruciate Intramedullary Nail. J. Am. Geriatrics Soc., *1,* (Aug., 1953): 579.

[8]Modny, M. T.: Exhibit, American Academy of Orthopedic Surgeons, Chicago, Ill., January, 1954.

[9]Modny, M. T.: Exhibit, New Jersey Medical Society, Atlantic City, March, 1954.

[10]Modny, M. T., Glen Ridge, N. J.: Personal communication, 1956.

[11]Townsend, K., and Gilfillan, C.: Open Reduction with Metallic Fixation in Man. J.A.V.M.A., *114*, (March, 1949): 141.

[12]Watson-Jones, R.: Medullary Nailing of Fractures After Fifty Years. J. Bone & Joint Surg., *32B*, (Nov., 1950): 694.

A Drier for Surgeons' Gloves

W. O. SLAPPEY, D.V.M., and
R. T. STAPLETON, D.V.M.

Fayetteville, North Carolina

Rubber gloves are often ruined because they are not cleaned and dried properly. This simple, inexpensive apparatus (fig. 1)

Fig. 1—Simple method for drying gloves—inflated glove (A); aluminum funnel (B); rubber stopper (C); pump (D); wooden block (E).

serves well as a drier. The equipment consists of an aluminum kitchen funnel for each glove, a rubber stopper from a rabies vaccine or penicillin bottle to plug the stem of the funnel, a football hand pump, and a 2- by 4-inch board in which holes have been bored for the stems of the funnels.

When surgery is finished the gloves are washed, removed from the surgeon's hands, and the cuffs are stretched over the tops of the funnels. The gloves are then inflated by air injected with the pump through the rubber stoppers. The inflated gloves allow the moisture on the inside to run into the funnels and the moisture on the outside to evaporate into the air. Gloves so treated dry in 20 minutes.

Dr. Slappey is a small animal practitioner and Dr. Stapleton is a general practitioner in Fayetteville, N. Car.

Surgical Correction of Traumatic Osteomyelitis in the Cow

D. D. DELAHANTY, D.V.M., M.S.

Ithaca, New York

A 4-year-old Holstein-Friesian cow was admitted to the large animal clinic of the New York State Veterinary College on Oct. 3, 1957, with the following history. A supporting right foreleg lameness had been present for four weeks and, after two weeks of lameness, pus had drained from the lateral surface of the middle of the metacarpal region but had stopped three to four days prior to admission. Previously, it had been treated with penicillin and streptomycin, and then with neomycin. The swelling had increased in size and the weight loss of the cow was estimated at 100 lb. Although the pasture was hilly, there was no history of trauma.

At the time of admission, the temperature, pulse, and respiration were normal. The metacarpal region of the right foreleg was twice the normal size. Heat, pain, and a moderate pitting edema existed. A dorsovolar radiograph (fig. 1) revealed a sequestrum of bone approximately 4 cm. long, surrounded by a slight involucrum. The medullary cavity was thought to be involved.

PROCEDURE

The leg was clipped, washed with soap and water, and an antisepticizing preoperative pack was applied to the leg. After a 24-hour fast, the cow was given 40 Gm. of chloral hydrate, orally, and 50 cc. of a proprietary mixture of chloral hydrate, magnesium sulfate, and phenobarbital solution, intravenously. She was then cast in left lateral recumbency. The ulnar and median nerves of the right forelimb were blocked with 2 per cent procaine hydrochloride solution.

The operative site was prepared with soap and water, ether, 70 per cent alcohol, and 2 per cent aqueous iodine. A tourniquet was applied just above the carpus and the operative field was draped. The small area containing the sinus tract was incorporated in an elliptical skin incision of 10 by 5 cm. On freeing the skin, a 1-cm. fibrous band of the sinus tract was found.

From the New York State Veterinary College, Cornell University, Ithaca.

Fig. 1—A dorsovolar radiograph of the right foreleg of a cow, showing a sequestrum of bone surrounded by a slight involucrum.

Fig. 2—Postsurgical radiograph of the right foreleg of a cow, after sequestrectomy and saucerization.

By sharp and blunt dissection the tract was followed to the sequestrum. The sequestrum outline existed as a distinct line of demarcation between the dead and viable bone at its volar border. The sequestrum was removed, leaving the medullary cavity exposed.

The simple sequestrectomy and saucerization[1] was continued with a light curettage of the cavity and the surrounding involucrum. The distal portion of the cortical defect was further saucerized (fig. 2) to assure adequate drainage. The cavity was packed with a nitrofurazone solution and a pressure bandage was applied.

Results

When discharged on the fourth day, the cow's temperature, pulse, and respiration were normal and there was a slight improvement in lameness.

The owner reported, on January 18, that the animal was sound, the incision healed, and his only concern was a slight lack of hair at the operative site.

[1]Christopher, F.: A Textbook of Surgery. W. B. Saunders, Philadelphia, 1949.

Sex Control via Centrifugation.—When a small fraction (1/15 to 1/20) of the most readily sedimenting bovine spermatozoa, separated by counter-streaming centrifugation, was used on 23 cows, the 11 calves resulting were all males. In a more extensive experiment, it was noticed that the sex predominance varied with the fertility percentages of the semen fractions. With the higher fertility group (63.8%), there were 28 female and 9 male calves; with the low fertility group (31.0%), there were 8 females and 18 males.—*Nature (March 15, 1958): 784.*

Trichomoniasis in an Artificial Insemination Bull Stud*

A. A. GABEL, D.V.M.; V. L. THARP, D.V.M.; JOSEPH L. THORNE, D.V.M.; HAROLD F. GROVES, D.V.M., M.Sc.; F. R. KOUTZ, D.V.M., M.Sc.; HAROLD E. ARMSTUTZ, D.V.M.

Columbus, Ohio

During the 14-month period of February, 1954, to April, 1955, trichomoniasis infection was found in 24 of 65 bulls in an artificial insemination stud and in 1 of 17 bulls purchased. Eighteen of the infected bulls were treated with bovoflavin massage of the penis and trypaflavin infusion of the urethra. One bull died of an unrelated condition and 2 were disposed of, due to poor semen quality, while a series of tests were being conducted following treatments. Three bulls were treated, then sold when found to be positive, since their value did not warrant further treatment. One of the bulls (No. 4) was slaughtered, because of an injury, following 25 negative tests.

Data Since Sept. 1, 1955.—The 11 other bulls treated have remained negative, following an average of 3.27 treatments per bull.

Three bulls have died due to unrelated conditions since the first article was written: bull 2 during September, 1955; bull 3 during June, 1956; and bull 7 during December, 1957. The following testing program (using the preputial douche test* exclusively) has been carried out:

Sept. 1, 1955, to May 1, 1956—weekly tests of the bulls treated successfully; monthly tests of all other bulls in the stud.

May 1, 1956, to Jan. 1, 1957—monthly tests of bulls treated successfully; tests every second month for all other bulls in the stud.

Beginning Jan. 1, 1957, and to continue indefinitely, all bulls in the stud are being tested quarterly.

The other phases of the health program developed* are being adhered to.

From the Ohio State University, Columbus.

*Sequel to "Trichomoniasis in an Artificial Insemination Bull Stud," by A. A. Gabel, V. L. Tharp, Joseph L. Thorne, Harold F. Groves, F. R. Koutz, and Harold E. Amstutz. J.A.V.M.A., 128, (Feb. 1, 1956): 119-123.

A Metal-Tipped Plastic Intravenous Needle.—A flexible needle for intravenous therapy, which can be sterilized by autoclaving, boiling, or immersion in antiseptic solutions, is described. It is made of teflon tubing, gauge 18 (or size desired), attached to a metal tip for easy insertion, and completed with a Luer hub. It may be left in the vein for several days.—*Am. J. Surg. (May, 1958): 853.*

Prolapsed Rectum of the Pig

Some 40 cases of prolapsed rectum in feeder pigs, usually 8 to 16 weeks old, were encountered in two years of general practice, in England. Only one case occurred in a herd where scouring was a problem.

The possibility of a hereditary predisposition, perhaps based on anatomical characteristics, such as decreased extraperitoneal connective tissue attachment of the rectum, was indicated by the fact that 9 of the 40 cases occurred in two litters from 1 sow. All 9 were sired by 1 boar. No prolapses occurred in an intervening litter from the same sow by a different boar.

However, the ration and intensive feeding may be a factor since 38 of the cases occurred under forced growth management. At 8 to 16 weeks of age, growth is rapid and food consumption relatively large. These prolapses seemed to occur instantaneously rather than gradually.

Treatment by resection of the mucous membrane was successful in 95 per cent of the cases. The prolapsed organ was washed and transfixed with two long needles inserted at right angles close to the anus. A circular incision was made, ¼ inch from the anal ring, and the mucous membrane, only, was reflected from the musculature and amputated at the prolapse extremity, leaving a "collar" of healthy mucosa projecting from the lumen. The incised edges of the mucosa were opposed with about eight sutures; the transfixing needles were removed; and the prolapse reduced. A perianal purse-string suture, to be removed in 48 to 72 hours, was inserted.

There were no recurrences but 1 animal died from obstruction following stenosis. In 1 case, the everted rectum was being amputated spontaneously by sloughing.—*J. C. Hindson in Vet. Rec. (March 8, 1958): 214.*

Nerve impulses coming from the brain, rather than air moving in the larynx, make the vocal cords vibrate and produce sound. —*Sci. News Letter (Feb. 15, 1958): 104.*

Control of Infectious Synovitis in Chickens. VI. Chlortetracycline in Field Experiments

N. O. OLSON, D.V.M., and D. C. SHELTON, Ph.D.

Morgantown, West Virginia

INFECTIOUS SYNOVITIS (IS), as caused by a filterable agent, was recognized as a separate disease entity in 1954.[2,4,11] Etiological and therapeutic studies have indicated that the agent is a large particle virus which is susceptible to antibiotics.[3] Little is known about the transmission of the disease. No serological tests are known for detection of the infection in live birds. To date, therapeutic drugs have provided the only means of control.

Field studies with therapeutic agents are difficult to evaluate since the birds are usually sold before the value of the drugs can be assessed. On one occasion, when IS occurred in birds in a flock of 5,000, at 10 weeks of age, a 20 per cent morbidity occurred within a two-week period—yet no more birds seemed to become infected even though they were given no medication and were retained as breeders.

This report covers observations on two therapeutic studies in field outbreaks and three controlled field experiments.

REVIEW OF LITERATURE

Continuous chlortetracycline therapy was effective in suppressing the development and severity of IS lesions, but 200 Gm./ton of feed was needed to prevent detectable signs of the disease.[4,5] Subsequent work has shown that control of IS in footpad-inoculated birds is dependent upon the time medication was initiated, in relation to the time of experimental infection.[1,9]

At 100 and 200 Gm./ton of feed, chlortetracycline, given continuously, controlled the infections caused by seven IS isolates. Two other IS isolates were relatively nonpathogenic and chlortetracycline did not inhibit the temporary signs induced by them. They were either atypical strains or other viral agents. The above concentrations of chlortetracycline partially controlled synovitis[6] due to PPLO.

Infectious synovitis caused by intramuscular exposure of birds 7 weeks old, and intravenous exposure of birds 6 weeks old, in which medication was started at the time of and four days after inoculation, respectively, was not prevented by feeding chlortetracycline at 200 Gm./ton of feed for five days, followed by 50 Gm./ton for 23 days.[10]

FIELD STUDIES

Field Study 1.—A flock of 9,000 Indian River crossbred birds had been vaccinated for Newcastle disease when 1 day old. During the first three weeks, they were fed chlortetracycline, 100 Gm./ton of feed.

When the birds were 9 weeks old, 165 birds with IS were culled to a hospital pen. Of these, 14 were not treated and 151 were treated with chlortetracycline, 800 mg./gallon of water for four days, followed by 400 mg./gallon until the birds were sold or killed 14 days later.

The mortality and average weight gain, respectively, during this period were 11.9 per cent and 0.87 lb. for treated and 28.6 per cent and 0.28 lb. for the untreated birds.

The remainder of the birds in the flock were given 800 mg./gallon for one day, followed by 300 mg./gallon until marketed five days later. No further cases of IS were noticed in this flock of birds.

Field Study 2.—Infectious synovitis was diagnosed in a pen of 4,000, 7-week-old White Rock-Vantress chicks of a 12,000-bird flock. The owner treated the birds with chlortetracycline, 80 Gm./ton for three days, followed by 50 Gm./ton for nine days. No response from the medication was apparent to the owner.

After this medication, 200 birds with IS were removed to separate pens and 29 were untreated, while 171 were given chlortetracycline at 800 mg./gallon of water for four days, followed by 400 mg./gallon, plus 200 Gm./ton in the feed for 14 days.

The mortality and average weight gain during this period was 14.6 per cent and 0.63 lb. for treated and 44.8 per cent and 0.35 lb. for the untreated birds, respectively.

The other birds on this floor were given chlortetracycline at 200 Gm./ton of feed for the remaining 12 days. There were approximately 100 culled chickens in this flock when they were sold.

RESULTS

The infected birds culled from the main flocks in studies 1 and 2 improved, as evidenced by increased feed intake, weight

Published with the approval of the director of the West Virginia Agricultural Experiment Station as scientific paper 556 from the Departments of Animal Husbandry and Animal Pathology, and Agricultural Biochemistry and Nutrition, West Virginia University, Morgantown.

Supported in part by regional funds allocated to regional project NE-5 and by funds from the American Cyanamid Co., New York, N.Y.

Presented before the Section on Poultry, Ninety-Fourth Annual Meeting, American Veterinary Medical Association, Cleveland, Ohio, Aug. 19-22, 1957.

gain, and a reddening of the comb. Of the 151 birds in trial 1, 60 per cent were salable, whereas none of the 171 treated birds in study 2 were salable at the end of the 14-day treatment period. None of the untreated birds from either flock were salable.

The average weight, feed conversion, and mortality of birds in the two field studies are recorded (table 1). In both studies, antibiotic therapy was followed by improvement in feed consumption and in appearance of the birds.

TABLE 1—Flock Treatment of Birds with Chlortetracycline, Following an Outbreak of Infectious Synovitis

Trial	Market age (days)	Days treated	No. of birds started	Mortality (%)	Average weight (lb.)	Feed/lb. of gain
1 *	70	6	9,000	2.3	3.2	2.7
2 infected†	81	24	4,000	11.6	3.4	2.9
2 not infected	81	None	4,000	0.12	3.4	2.8

*Treatment with 800 mg. of chlortetracycline/gallon of water for one day and 300 mg./gallon of water for five days; †80 Gm. of chlortetracycline per ton of feed for three days, 50 Gm./ton for nine days, and 200 Gm./ton for 12 days.

CONTROLLED FIELD EXPERIMENTS

Available for these experiments was a 20- by 80-ft. house divided by solid wooden partitions into 20- by 20-ft. pens, each equipped with removable wire partitions to permit subdivision into 10- by 20-ft. pens. In each of these eight pens, 200 chicks were started.

A commercial open formula broiler feed containing penicillin (3 Gm./ton), 3-nitro-4-hydroxyphenylarsonic acid (0.005%), and nicarbazin (0.0125%) was used as the basal ration. Chlortetracycline (feed grade) at desired levels was incorporated just prior to usage.

The chicks were wing-banded and individual records were maintained. Minor losses occurred prior to inoculation. After inoculation, the birds were observed daily and individually examined periodically to determine the progress of the disease. The degree of the swelling was classified according to the system used by Shelton *et al.*[1]

Experiment 1.—This experiment was conducted to determine if medication could be given continuously through the first seven weeks in experimentally infected birds and discontinued at that time without the infection recurring in the chicks before marketing at 10 weeks of age.

For this study, 100 New Hampshire chicks and 100 three-way cross chicks were started in each pen. Chicks in duplicate pens were given chlortetracycline at 50, 100, or 150 Gm./ton of feed, starting when 1 day old. The unmedicated birds were given only the basal ration. At 2 weeks of age, all the birds except the 200 noninfected controls were exposed by footpad inoculation with 0.25 ml. of the third embryo yolk passage of IS agent 29M. The above treatments were maintained until the birds were 7 weeks old, at which time the chlortetracycline medication was discontinued for birds in one pen at each medication level.

The birds were observed until marketed at 10 weeks of age and then on the dressing line. All birds which died during the experiment were necropsied.

The experimental design, average weights at 7 and 10 weeks, mortality as a result of IS, and the number of infected birds are shown (table 2). A 19 per cent mortality and a 93 per cent morbidity occurred in the infected control birds (fig. 1).

All levels (50, 100, or 150 Gm./ton) of chlortetracycline controlled the disease (fig. 2). At 7 weeks of age, withdrawal of the drug from half the birds at each level of medication had no adverse effects on weight gain, and no signs of IS appeared.

Experiment 2.—Although chlortetracycline was effective when birds were exposed experimentally by the footpad route, its efficacy in birds inoculated via the sinus was unknown. Preliminary experimental work had shown that approximately 25 per cent of the birds exposed by the sinus route to

TABLE 2—Effect of Chlortetracycline on Weight of Birds and Control of Synovitis when Birds Were Exposed at 2 Weeks of Age by Foot Pad Inoculation*

Treatment (Gm./ton of feed)	Duration of treatment (wk.)	No. birds inoculated	Average weight (lb.)		No. deaths/ No. affected†
			7 wk.	10 wk.	
None	Control	0	2.10	3.04	0/0
None	Control	195	1.41	2.07	37/182
50	7	199	2.05	3.00	0/0
50	10	199	2.05	3.03	0/0
100	7	196	2.04	2.97	0/0
100	10	195	2.04	2.97	0/0
150	7	195	2.04	3.03	0/0
150	10	192	2.06	3.08	0/0

*The degree of infection in the inoculated leg at 7 weeks was 6.4; †number of deaths as a result of synovitis/number affected with synovitis.

Fig. 1—Seven-week-old birds from controlled field experiment 1. These birds were given no medication and were inoculated at 2 weeks of age. Note the many typically droopy birds with infectious synovitis around the feeder.

IS agent 29M became infected, and the disease spread to approximately 15 per cent of the contact control birds.

In experiment 2, only 1 of 800 birds inoculated in the sinus developed IS. This bird was in the unmedicated control group. (It appeared from the results of experiment 3 that the pathogenicity of agent 29M had been reduced and this may have accounted for its reduced infectivity by the sinus route.)

Experiment 3.—Previous work suggested that neither chlortetracycline nor oxytetracycline was as effective in birds exposed at 5 weeks of age as when exposed at 2 to 3 weeks of age. This could have been due to the age of the bird or to the pathogenicity of the culture.

Day-old New Hampshire chicks were obtained from the same group of hens. Two groups of 800 chicks each were made available at two-week intervals. The chicks of each group were allotted to four pens, 200 birds per pen, and these were given chlortetracycline at 50, 100, or 200 Gm./ton of feed. Birds in one pen received only the basal ration. When the birds were 3 and 5 weeks old, they were exposed on the same day with 0.25 ml. of IS culture, 29M or 1853, and observations continued for seven weeks.

In each pen, approximately 100 birds were exposed by the footpad route (50 with IS agent 29M and 50 with IS agent 1853), approximately 50 birds were exposed via the sinus (25 with IS agent 29M and 25 with IS agent 1853), and approximately 50 birds were left as contact controls.

RESULTS

The average weight and feed conversion for all treated birds are given (table 3). The number infected, degree of infection, extension of infection to other joints, deaths as a result of IS, and 10-week

Fig. 2—Seven-week-old birds from controlled field experiment 1. These birds were given 50 Gm. of chlortetracycline continuously and were inoculated with infectious synovitis at 2 weeks of age.

TABLE 3—The Effect of Chlortetracycline on Average Weight and Feed Conversion when Birds Were Inoculated with Synovitis at Different Ages

Treatment (Gm./ton)	Age when inoculated (wk.)	No. of birds			Final weight (lb.)	Feed/lb. of gain
		Contact controls	Sinus-inoculated	Pad-inoculated		
50	5	50	46	97	3.44	3.06
100	5	50	50	95	3.65	2.95
200	5	49	50	99	3.47	3.06
None	5	45	45	98	2.93	3.23
50	3	50	49	95	3.34	3.09
100	3	50	47	97	3.34	3.17
200	3	48	46	96	3.30	3.08
None	3	46	48	99	2.72	3.56

weights for birds exposed to two agents by two routes of inoculation at two ages are given (table 4).

The results of the tests in which birds were given 100 and 200 Gm. of chlortetracycline per ton of feed are not shown, since only 2 of 93 birds inoculated via the footpad showed slight swellings in the pad when observed at 10 weeks of age. Comparisons of dressed infected and noninfected birds are shown (fig. 3). Chlortetracycline provided satisfactory control of IS at 50, 100, and 200 Gm./ton of feed. The few birds that were affected at the 50-Gm. level did not lose weight and, generally, the infection was localized in the inoculated leg. None of the treated birds that were inoculated via the sinus developed IS.

The susceptibility of birds to IS was influenced by the age of the chicks and the route of inoculation. Birds inoculated in the footpad, when 3 weeks old, weighed less at 10 weeks than did those infected at 5 weeks. Likewise, a larger percentage of deaths and extension of infection occurred in the younger birds. In the sinus-inoculated birds, no difference in susceptibility was apparent between the 3- and 5-week-old birds. Of the contact controls, 3 of 45 birds, as compared with 1 of 46 birds, became infected in the 5- and 3-week-old groups, respectively. However, 2 of the 29M sinus-inoculated birds developed IS, possibly the result of contact exposure since inoculated birds were in the same pen.

Agent 1853 was more pathogenic than agent 29M. In the control groups at either age, lesser weight gains and greater mortality occurred with strain 1853 than 29M, irrespective of the route of inoculation. Also, the pathogenicity via the sinus

TABLE 4—The Relationship Between Age of Bird, Pathogenicity of Synovitis Agent, and Route of Inoculation on the Efficacy of Chlortetracycline as Determined by Weight at 10 Weeks, Number Infected, Degree and Extension of Infection to Other Joints, and Deaths as a Result of IS Following Inoculation

Treatment (Gm./ton)	Inoculation			No. infected		Degree of infection		Extension (No./%)	Deaths (No./%)	Wt. at 10 wk. (lb.)
	Age (wk.)	Agent	Route	14 days	49 days	14 days	49 days			
None	3	1853	Footpad	44/49	14/14	6.7	8.1	47/96	35/71	1.5
		29M	Footpad	46/50	35/39	7.9	6.6	30/60	11/22	2.3
		1853	Sinus	3/24	5/19	3.0	6.2	8/33	5/21	2.9
		29M	Sinus	0/24	2/24	0	5.0	1/4	0	3.0
		None	Contact	0/46	1/46	0	6.0	1/2	0	3.2
None	5	1853	Footpad	36/40	29/30	7.3	6.4	33/83	6/15	2.2
		29M	Footpad	47/50	47/50	7.6	5.3	26/52	0	2.7
		1853	Sinus	2/26	5/24	4.0	4.4	6/19	2/4	3.2
		29M	Sinus	0/19	0/19	0	0	0	0	3.6
		None	Contact	0/45	3/45	0	5.0	2/4	0	3.4
50	3	1853	Footpad	1/47	3/47	1.0	3.0	1/2	0	3.3
		29M	Footpad	8/46	0/46	1.25	0	0	0	3.3
		1853	Sinus	0/25	0/23	0	0	0	0	3.6
		29M	Sinus	0/24	0/24	0	0	0	0	3.4
		None	Contact	0/50	0/50	0	0	0	0	3.3
50	5	1853	Footpad	9/48	7/47	1.9	3.9	1/2	1/2	3.4
		29M	Footpad	10/49	0/47	1.6	0	0	0	3.5
		1853	Sinus	0/23	0/23	0	0	0	0	3.2
		29M	Sinus	0/23	0/23	0	0	0	0	3.6
		None	Contact	0/50	0/49	0	0	0	0	3.5

route was more pronounced with agent 1853.

At the 50-Gm. level of chlortetracycline treatment, 7 of 47 birds inoculated when 5 weeks of age and 3 of 47 inoculated at 3 weeks of age showed evidence of infection produced by agent 1853. These results indicate that higher levels of chlortetracycline may be needed to control more pathogenic IS agents. However, the results of this experiment indicate that the extra cost of the higher concentration of chlortetracycline is not warranted.

Rupture of the gastrocnemius tendon occurred in 5.5 per cent of the birds in this experiment, irrespective of treatment or inoculation. This had not been noticed in previous experiments. The cause of this condition is not known.

DISCUSSION

Field birds with established clinical cases of infectious synovitis generally have not responded to drug therapy. With chlortetracycline therapy, further spread ceased (field study 1) and, if the infection had not progressed too far, there was some improvement in infected birds (field study 2). Usually, 200 Gm./ton of feed was necessary. If only 50 Gm./ton was used after signs of infection appeared, as in field study 2, IS was not controlled. Higher levels of antibiotics have been required after the infection has been established[7] or when overwhelming doses of inoculum have been used.[10]

Previous experiments[1,8,9] have consistently shown that chlortetracycline, 100 and 200 Gm./ton of feed, given to experimentally infected birds will prevent the development of IS; at 50 Gm./ton, some infection occurred. In one experiment,[9] the infection was mostly localized and did not influence the growth rate and feed conversion of the birds whereas, in another experiment[6] using older birds and only an 18-day experimental period, chlortetracycline at 50 Gm./ton had moderate effect.

Using larger numbers of birds under controlled field conditions, chlortetracycline at 100, 150, or 200 Gm./ton of feed given continuously has consistently prevented the occurrence of infectious synovitis.

In experiment 1, chlortetracycline, 50 Gm./ton, prevented signs of the disease—yet in the infected control birds a 19 per cent mortality and 93 per cent morbidity occurred. No signs of IS appeared after the antibiotic was withdrawn, at 7 weeks of age, from the previously medicated birds. In experiment 3, at the 50-Gm./ton level, no infection could be detected from agent 29M, but with agent 1853, 10.6 per cent of the birds had a small amount of infection. However, the infection was localized and did not adversely affect the growth rate or feed conversion ability of the birds. The efficacy of the antibiotic under field conditions depended on the pathogenicity of the agent. In the untreated birds, the severity of the disease was influenced by the age of the bird when the infection developed.

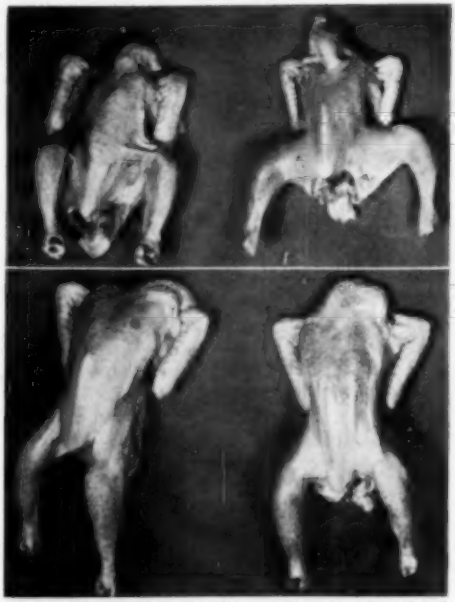


Fig. 3—Ten-week-old broilers which were inoculated via the footpad with infectious synovitis when 3 weeks old. The 2 emaciated birds (top) were infected controls. The 2 birds (bottom) were given 50 Gm. of chlortetracycline per ton of feed continuously.

The application of these results to field conditions indicate that chlortetracycline at 50 Gm./ton of feed given continuously should provide satisfactory control of IS but, since that appeared to be the minimum effective dose, higher amounts should be given when the disease occurs or when intercurrent infections reduce feed consumption. The authors have observed IS in the field in birds given the 50-Gm.

level of chlortetracycline continuously. However, signs of infection and necropsies of birds in these flocks indicated that the infection was complicated with acute CRD.

In field studies 1 and 2 and experiments 1 and 3, clinical signs of CRD were not present.

SUMMARY

When chickens experimentally infected with infectious synovitis (IS) under controlled field conditions were continuously fed chlortetracycline, at 100 Gm. or more per ton of feed, starting before the infection was established, only an occasional bird was affected with the disease.

Under the same conditions, IS was clinically but not completely controlled by feeding chlortetracycline at the 50-Gm. level.

The pathogenicity of the inoculum influenced the therapeutic value of chlortetracycline.

The age of birds when the infection occurred was shown to influence the severity of the disease. Birds inoculated at 3 weeks of age showed a greater reduction in growth rate and in feed conversion than birds inoculated at 5 weeks of age.

Birds severely infected with IS responded slowly to chlortetracycline therapy.

References

[1]Bletner, J. K., Shelton, D. C., Olson, N. O., and Weakley, C. E., Jr.: Control of Infectious Synovitis. 3. The Efficacy of Aureomycin with Relation to Time of Inoculation. Poult. Sci., *36*, (1957): 1016-1022.

[2]Cover, M. S., Galeta, J. N., and Waller, E. F.: The Etiology of an Arthritis Disease of Chickens. Am. J. Vet. Res., *17*, (1956): 12-15.

[3]Lecce, J. G., Sperling, F. G., Hayflick, L., and Stinebring, W.: Tendovaginitis with Arthritis, a New Syndrome of Chickens. Isolation and Characterization of an Infectious Agent. J. Exptl. Med., *102*, (1955): 489-498.

[4]Olson, N. O., Shelton, D. C., Bletner, J. K., Munro, D. A., and Anderson, G. C.: Studies of Infectious Synovitis in Chickens. Am. J. Vet. Res., *17*, (1956): 747-754.

[5]Olson, N. O., Shelton, D. C., and Munro, D. A.: Infectious Synovitis Control by Medication. Effect of Strain Differences and Pleuropneumonia-like Organisms. Am. J. Vet. Res., *69*, (1957): 735-739.

[6]Olson, N. O., Shelton, D. C., Bletner, J. K., and Weakley, C. E., Jr.: Infectious Synovitis Control. 2. A Comparison of Levels of Antibiotics. Am. J. Vet. Res., *18*, (1957): 200-203.

[7]Shelton, D. C., Olson, N. O., and Weakley, C. E., Jr.: Synovitis Control. 4. Antibiotics and Furazolidone (NF-180). Poult. Sci., *35*, (1956): 1171.

[8]Shelton, D. C., Bletner, J. K., Olson, N. O., Anderson, G. C., and Weakley, C. E., Jr.: Control of Infectious Synovitis. 1. Continuous Feeding of Antibiotics and the Influence of Diethylstilbestrol and Coccidiostats. Poult. Sci., *36*, (1957): 113-121.

[9]Shelton, D. C., and Olson, N. O., Morgantown, W. Va.: Synovitis Control. 7. Comparison of Tetracycline Antibiotics. Unpublished data.

[10]Wills, F. K., and Delaplane, J. P.: Transmission and Therapy Studies on an Agent which Produces Arthritis in Chickens. Proc. Book, AVMA (1955): 350-356.

[11]Wills, F. K.: Studies of an Unidentified Agent Producing Arthritis in Chickens. Southwest. Vet., *8*, (Winter, 1955): 2.

Avian Infectious Hepatitis

Primary liver degeneration in chickens has been observed in Massachusetts. Under field conditions, the onset of signs was insidious and egg production decreased. Flock mortality ranged up to 15 per cent during several weeks.

On necropsy, there were degenerative and hemorrhagic lesions in the livers of mature birds but, in younger birds, the hearts were more severely and consistently involved, with a straw-colored gelatinous exudate on the pericardium and a more watery material distending the pericardial sac. Chicks appeared more susceptible than older birds.

The filterable causal agent, which is readily propagated in chicken embryos, was more susceptible to furazolidone and dihydrostreptomycin sulfate than to other chemotherapeutic agents. Therapeutically, furazolidone was highly effective in altering the course of the disease and was somewhat superior to dihydrostreptomycin.—*M. Sevoian, R. W. Winterfield, et al. in Avian Dis. (Feb., 1958): 3 and 19.*

Insect Transmission of Brucellosis.—Brucella were demonstrated in 11.1 per cent of flies caught in a cowshed where cows with brucellosis had aborted, and in 13 per cent of the flies caught on the manure heap on the same farm. Brucella were on the surface of the body in two thirds of the infected flies and in the digestive systems of the others. Brucella survived for seven days in experimentally infected flies and for 48 to 72 hours in mosquitoes.—*Vet. Bull. (March, 1958): Item 695.*

Five workers developed brucellosis shortly after 400 infected sheep were slaughtered at their abattoir in Germany.—*Vet. Bull. (Feb., 1958): Item 370.*

Disseminated Coccidioidomycosis of the Dog

KEITH T. MADDY, D.V.M., M.P.H.

Atlanta, Georgia

COCCIDIOIDOMYCOSIS had been considered a rare infection in the dog until recent years. Recent studies and others underway indicate that in certain areas of the southwestern United States this infection often occurs.

HISTORY

A total of 15 cases of coccidioidomycosis were reported[2-7,12,14-16] from scattered areas by 1955. In all but 1 of these cases[7] the infection was disseminated throughout the body. In 1954, 25 cases were reported[9] from the Tucson area and, in 1956, 27 disseminated cases were added.[10] Further reports were made[1] on 5 of these cases. Since 1956, many more disseminated cases have been diagnosed in the Tucson, Ariz., area.[11] The author has observed over 150 cases of disseminated infection in the Phoenix, Ariz., area.

STUDY OF 100 DOGS

Between October, 1954, and April, 1956, I did necropsies on 100 dogs with disseminated coccidioidomycosis. All of these dogs came from within a 50-mile radius around Phoenix, Ariz.—a known endemic area for human and bovine coccidioidomycosis. The number of cases observed in man and cattle in this area, during the study period, was no greater than normal.

Most of the dogs were observed antemortem, and pertinent clinical data were collected on all of them. The diagnosis was usually based on finding endosporulating spherules of *Coccidioides immitis* in lesion material by direct microscopic examination. In all the other cases, spherules containing endospores were demonstrated during examination of tissue sections (fig. 1). Also, all diagnoses were verified by isolation of *C. immitis* on Sabouraud's dextrose agar (fig. 2, 3).

During this period, other dogs with typical gross lesions were examined. Smears from their lesions were found to be negative for *C. immitis* under direct microscopic examination, and time and facilities did not permit examination of tissue sections. However, in many cases, this organism was isolated from lesion material by culture.

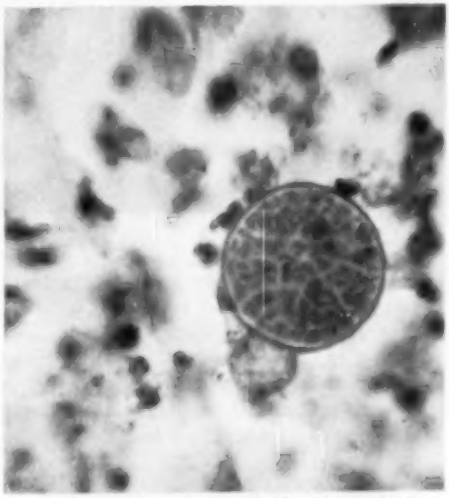


Fig. 1—Sporangium of Coccidioides immitis in tissue section of lung of infected dog. x 970.

During antemortem examinations of another group of dogs with disseminated lesions, spherules of *C. immitis* were demonstrated in smears of exudate from the lesions, and *C. immitis* was recovered by culture methods. No necropsies were performed on these dogs. A number of other dogs with lesions suggestive of disseminated coccidioidomycosis were offered for study, but lack of time prevented this.

Thus, the 100 confirmed disseminated cases we studied in detail represented only a portion of the cases occurring in the Phoenix area during the period. A number of nondisseminated cases were also tentatively diagnosed by means of clinical observations, radiographic studies, skin tests, and precipitin tests.

From the Communicable Disease Center, Public Health Service of the Department of Health, Education and Welfare, Atlanta, Ga.

The author acknowledges the help of the following veterinarians of Maricopa County, Ariz., in conducting this study: Drs. L. R. Becker, F. R. Benton, W. P. Blake, G. S. Calderwood, J. R. Carney, J. P. Fuller, F. E. Harvey, H. B. Hood, J. W. Langley, C. E. Larsen, R. W. Lybrook, R. E. McComb, B. Mariassy, W. E. Merrit, J. Micuda, J. E. Sharkey, and T. T. Smith.

Fig. 2—Mycelial phase of Coccidioides immitis growing on Sabouraud's agar.

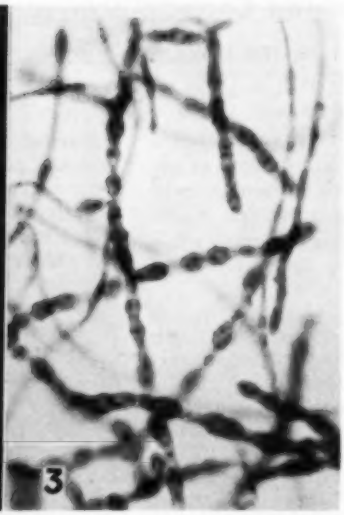


Fig. 3—Stained smear of mycelial phase of Coccidioides immitis, showing arthrospores formed within the mycelia. x 970

The population of dogs above 6 months of age in the study area (Maricopa County) was estimated to be 73,000, with an average age of 4½ years.

Age, Sex, and Breed.—The majority of disseminated coccidioidomycosis cases in this series occurred in dogs less than 2 years of age (table 1). When the population of various breeds in the area was considered in relation to the prevalence of coccidioidomycosis, Boxers and Doberman Pinschers appeared to be more susceptible to dissemination of the infection than other breeds (table 2).

TABLE 1—Age Distribution of 100 Dogs with Disseminated Coccidioidomycosis

Age (yr.)	No.	Age (yr.)	No.
0-0.5	9	2.5-3.0	8
0.5-1.0	27	3.0-3.5	2
1.0-1.5	23	3.5-4.0	3
1.5-2.0	17	4.0-4.5	1
2.0-2.5	7	4.5-	3

TABLE 2—Distribution According to Breed of 100 Dogs with Disseminated Coccidioidomycosis

Breed	No.	Breed	No.
Boxer	39	Beagle	3
Mixed	16	Pointer	3
Doberman Pinscher	11	Shepherd	3
Boston Terrier	6	Dalmation	2
Fox and Rat Terriers	6	Great Dane	1
Collie	4	German Shepherd	1
Cocker Spaniel	4	Basset Hound	1

The infected mixed-breed dogs often appeared to look somewhat like Boxers, Doberman Pinschers, or other dogs of the same genetic breed group. However, after dissemination occurred, no statistically significant difference in the occurrence of various signs and lesions was found in the different breeds.

Of the 100 dogs studied, 41 were females and 59 were males, although the general proportion in the area is estimated at 36 females to 64 males. Of the 27 disseminated cases in dogs between 6 months and 1 year of age, 19 were in males and only 9 in females.

Primary Illness.—Of the 100 dogs studied, 22 had no history suggestive of primary coccidioidomycosis. Respiratory illness, typical of the early nondisseminated disease, occurred in the other 78 from two weeks to two and one half years before signs of dissemination became evident. All of these had episodes of coughing ranging in duration from one week to two years, with a median time of two weeks.

During the primary illness, 63 had fevers of 103.0 to 106.0 F., but usually about 104.5 F. Antibiotics, administered to 53 of these dogs, failed to permanently reduce the fever in all cases. Forty-two of the dogs had anorexia during the primary illness.

Careful observation, study, and use of serological and skin tests now indicate that many dogs, like human beings, acquire coc-

cidioidomycosis with or without apparent primary illness. The disease may proceed no further, and probably lifelong immunity to reinfection is thereby established.

Signs of Dissemination.—In man, dissemination is said to occur in about 1 of every 500 cases of primary infections. At present, the dissemination rate in dogs appears to be higher.

In this series of dogs, the median time at which dissemination became clinically apparent was four months after the primary illness was noticed. In the majority of cases, the primary respiratory illness, which lasted about two weeks, was followed by three to five months of apparent good health before dissemination became apparent.

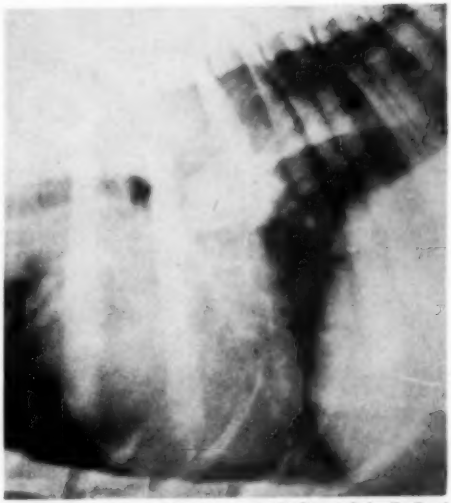
A few dogs showed signs of dissemination after two or three weeks of illness, with no intervening period of good health, whereas a few others appeared to be in good health for periods up to two and one half years between the primary and disseminated phases of their illness. Some dogs had intermittent periods of coughing and fever lasting a few days and others developed a chronic cough that persisted throughout the interval between the primary and disseminated illness.

Signs of dissemination varied considerably. Periods of coughing were common. The body temperature followed erratic courses, but often rose to about 104 F. daily. Some of the dogs had good appetites, with only occasional periods of anorexia. A number that had large lung lesions experienced difficulty in swallowing. Of the 45 dogs that lost weight during dissemination, 22 had chronic diarrhea, but only 5 of the others were so affected. Ascites was observed in 8 dogs. Lameness, often followed by atrophy of the unused leg muscles, was noticed in 58 dogs.

Diagnostic Studies.—Radiographs of the thorax of 14 dogs, taken during the dissemination process, revealed densities in the hilar area, constriction of the end of the trachea, dense areas around the large bronchi, and lesions of various sizes and numbers throughout the lungs (fig. 4). Bone radiographs revealed considerable new bone formation associated with some bone destruction (fig. 5).

Skin tests, using undiluted coccidioidin,* were performed on 91 of the dogs, with 70 (76.9%) showing positive results and 21 (23.1%) negative results. Some human beings with disseminated infections also fail to give positive skin-test reactions.[12]

*Lots 15087 and 59-62, furnished by C. E. Smith.



—*Radiograph by R. Reed*

Fig. 4—Radiograph of the thorax of a dog undergoing dissemination. Notice density in hilar area.

—*Radiograph by B. Mariassy*

Fig. 5—Radiograph of the radius and ulna of a dog with coccidioidomycosis. Lateral (left) and posterior (right) views of affected ulna.

Fig. 6—Two coccidioidal granulomas in the lung (cut open).

Precipitin tests were made on serums of 86 of the dogs; 51 were positive and 35 were either negative or indefinite. Positive results were obtained more readily on serums drawn early in dissemination. The precipitin test furnished some slight indication of the extent of dissemination. At necropsy, 44 separate lesions classified as extensive were found in the 35 dogs that had given negative or indefinite precipitin test results (1.26 lesions per dog); 86 separate, extensive lesions were found in the 51 dogs with positive reactions (1.7 lesions per dog.)

Fig. 7—Dog at onset of dissemination. Notice beginning of emaciation and also lameness in right hindleg due to lesion at proximal end of femur.

TABLE 3—Major Lesions Found in Soft Tissues at Necropsy of 100 Dogs with Disseminated Coccidioidomycosis

Location	Extent			
	None	Slight	Well marked	Extensive
Lungs	....	23	33	44
Thoracic lymph nodes	8	45	18	29*
Liver	10	67	15	8
Spleen	23	62	7	8
Kidneys	42	35	20	3
Pericardium	63	19	9	9
Bladder	90	2	1	7

*25 of these had extensive lung lesions also.

Postmortem Observations.—Most of the dogs were euthanatized with an anesthetic when their condition became hopeless; the others died as a result of the disseminated disease. All were examined for gross lesions.

It was possible to correlate some of the major lesions found in the soft tissues (table 3, fig. 6) and some of the untabulated lesions with the signs observed during the dissemination process. For example, pulmonary signs had been noticed in 10 of the dogs later found to have slight lung lesions, in 22 of the 33 with well-marked lesions, and in 40 of the 44 with extensive lung lesions. At necropsy, 19 of the dogs were found to have enteritis; all of these had had chronic diarrhea, and 15 of them had lost weight during dissemina-

TABLE 4—Location of Osseous Lesions in 59 Dogs with Leg Bone Lesions Caused by Coccidioides Immitis

Foreleg		Hindleg	
Bone or joint area	No. affected	Bone or joint area	No. affected
Scapula	2	Hip joint	4
Shoulder joint area	2	Femur	5
Humerus	3	Patella	1
Elbow joint area	1	Stifle joint area	5
Radius	3	Tibia	4
Ulna	4	Fibula	3
Carpals	22	Tarsals	7
Metacarpals	4	Metatarsals	7
Phalanges	2	Phalanges	4
Totals	43		38

*Some dogs had multiple leg bone lesions.

Fig. 8—Coccidioidomycosis lesions in lungs, liver, spleen, and carpus of a dog. Notice the numerous small granulomas, particularly in the lungs.

tion. The 8 dogs with ascites all showed evidence of pericarditis—in 3 of these, lesions of the pericardium were slight and in 5 they were extensive.

In addition to the lesions listed (table 3), small separate subcutaneous lesions draining to the surface were observed in 3 dogs. Some leg bone lesions of long duration also produced sinuses draining through the skin. Two dogs had well-marked granulomas of the submaxillary lymph nodes; in 1, this was associated with a well-marked lesion of the trachea. One dog had a granuloma in the peritoneal cavity, and another had a large granuloma in the periorbital fascia behind the eye. The fifth dog had grossly visible granulomas scattered throughout its entire body. This dog went blind two days before it was destroyed, and *C. immitis* was cultured from the vitreous humor.

TABLE 5—Relationship Between Lameness and Occurence of Leg Bone Lesions in 100 Dogs with Disseminated Coccidioidomycosis

	No. of dogs	Extent of bone lesions			No. of dogs with visible bone lesions
		Slight	Well marked	Extensive	
Lameness	58	8	6	33	47
No lameness	42	2	0	10	12
Totals	100	10	6	43	59

Bone lesions—particularly in the legs—are often obvious during the dissemination process. At necropsy, 59 dogs had gross lesions of the leg bones, usually near the epiphyseal junction (table 4). In some instances, the lesions extended to all the bones in the joint area. During life, 47 of the dogs had shown signs of lameness (table 5). Twenty-eight of the dogs with lesions in the leg bones had them in other bones as well (table 6); (fig. 7-10).

The gross and microscopic pathology of coccidioidomycosis has been described adequately elsewhere.[2,4,6,10,14,15] It is very similar in man and dog, except in regard to bone lesions. In man, the lesions tend to be more destructive, whereas in the dog they are more proliferative. Although only a small amount of tissue sectioning was done in the present study, microscopic lesions were no doubt present in many areas where there were no gross lesions.

TABLE 6—Coccidioidomycosis Bone Lesions in Bones Other than Leg Bones in 29 Dogs with Leg Bone Involvement

Location	Extent		
	Slight	Well marked	Extensive
Ribs	5	5	1
Mandible	1	2	..
Pelvis	..	..	3
Lumbar vertebrae	..	2	..
Thoracic vertebrae	..	1	..
Cervical vertebrae	..	1	..
Skull	..	1	..
Sacrum	..	1	..
Ribs and pubis	..	1	1
Ribs and ilium	..	1	1
Ribs and lumbar vertebrae	..	..	1
Pelvis and mandible	..	..	1
Ribs, ilium, and sacrum	..	..	1

Fig. 9—Advanced coccidioidomycosis dissemination in a dog. This dog was emaciated and lame in the left foreleg due to a lesion at the distal end of the humerus.

Fig. 10—An open draining coccidioidomycosis lesion in the left carpus of a dog (arrow). Notice also the muscle atrophy and cachexia.

Treatment.—No known specific antimycotic for effective treatment is commercially available. A number of studies are in progress in this field.

DISCUSSION

Coccidioidomycosis is a common infection of mammals in the Southwest and appears to be acquired almost exclusively in the Lower Sonoran Life Zone[8] (fig. 11). Infection is acquired by inhalation of dust containing arthrospores of this fungus which propagates in the soil in this area.

Within this general area, there are three highly infective areas where a majority of the canine cases could be expected to occur. One is the part of Texas south of New Mexico extending along the Rio Grande to Laredo. One is the south central part of Arizona, particularly Pima, Pinal, and Maricopa counties. The other area is the San Joaquin Valley of California extending from Bakersfield north to about Modesto.

Considering the present mobility of the American public and the dogs that accompany them, alert diagnosticians may well

Fig. 11—The Lower Sonoran Life Zone of the United States. Coccidioides immitis appears to propagate in the soil almost entirely in this zone.

detect infections in dogs far from the area where they became infected. Dogs may be infected by inhalation of dust on fomites far from the endemic area. Dust-laden automobile tires are likely agents of transmission.

In general, the infected mammal is not considered a direct threat to other mammals. However, studies now in progress on dogs with disseminated and nondisseminated cases of coccidioidomycosis indicate that a few of these animals release large numbers of sporangia in their saliva, urine, feces, and wound exudates, and that mycelia and infective arthrospores develop within a few days on the contaminated soil. Although this may not provide a substantial reservoir of infection insofar as public health is concerned, possible risk to the dog owner and his family may have to be considered.

SUMMARY

The clinical signs and pathological changes in 100 cases of disseminated coccidioidomycosis in the dog are described. This form of the infection usually makes the animal a hopeless invalid if it does not result in its death. At present, there is no satisfactory treatment. It is pointed out that this illness possibly is far more common in the dog in the Southwest than had been suspected.

References

[1]Ajello, L., Reed, R. E., Maddy, K. T., Budurin, A. A., and Moore, J. C.: Ecological and Epizootiological Studies on Canine Coccidioidomycosis. J.A.V.M.A., *129,* (1956): 485-490.

[2]Cordy, D. R., and Hoop, J. D.: Coccidioidomycosis of the Skeleton in a Dog. North Am. Vet., *34,* (1953): 44-46.

[3]Eville, T. B.: Case Report—Male Boxer. California Vet., *7,* (1954): 21.

[4]Farness, O. J.: Coccidioidal Infection in a Dog. J.A.V.M.A., *97,* (1940): 263-264.

[5]Hage, T. J., and Moulton, J. E.: Skeletal Coccidioidomycosis in Dogs. Cornell Vet., *44,* (1944): 489-500.

[6]Jasper, D. E., and Lewis, J. S.: Coccidioidomycosis in the Dog. North Am. Vet., *32,* (1951): 37-40.

[7]Levan, N. E., and Burger, C. H.: Coccidioidomycosis in Dogs. Report of Three Cases. California Med., *83,* (1955): 379-380.

[8]Maddy, K. T.: Ecologic Factors Possibly Relating to the Geographic Distribution of *Coccidioides Immitis.* Proc., Symposium on Coccidioidomycosis, Phoenix, Ariz., February, 1957. Published by Communicable Disease Center, Public Health Service, Dept. of Health, Education and Welfare, Atlanta, Ga. (1957): 144-157.

[9]Reed, R. E.: Serology and Coccidioidin Skin Testing in Diagnosis of Canine Coccidioidomycosis. Proc. Book. AVMA (1954): 199-203.

[10]Reed, R. E.: Diagnosis of Disseminated Canine Coccidioidomycosis. J.A.V.M.A., *128,* (1956): 196.

[11]Reed, R. E.: Nonfatal Coccidioidomycosis of Dogs. Proc., Symposium on Coccidioidomycosis, Phoenix, Ariz., February, 1957. Published by Communicable Disease Center, Public Health Service, Dept. of Health, Education and Welfare, Atlanta, Ga. (1957): 101-104.

[12]Short, G. E., Schleicher, E. M., and Rice, W. M.: Coccidioidomycosis in a Kansas Dog. J.A.V.M.A., *128,* (1955): 352-353.

[13]Smith, C. E., Whiting, E. G., Baker, E. E., Rosenberger, H. G., Beard, R. R., and Saito, M. T.: The Use of Coccidioidin. Am. Rev. Tuberc., *57,* (1948): 330-360.

[14]Smith, H.: Coccidioidomycosis in Animals, with Report of a New Case in a Dog. Am. J. Path., *24,* (1948): 223-233.

[15]Spreigel, J. M., and Milliff, J. H.: Coccidioidomycosis in a Dog. J.A.V.M.A., *112,* (1948): 244.

[16]Watson, B.: Coccidioidomycosis in a Dog. Iowa State College Vet., *15,* (1953): 93-94.

Coccidioidomycosis in Dogs

Dogs infected by intratracheal insufflation with a suspension, in saline solution, of 1,000 to 1,000,000 *Coccidioides immitis* arthrospores were observed for signs of primary infection. Cough, listlessness, diarrhea, anorexia, weight loss, dry mucosae, and loss of hair appeared in two to 28 days after infection; the signs were earlier and more severe in dogs given higher numbers of spores.

Gross and microscopic tissue changes observed in dogs infected for four to 185 days ranged from inflammation, in earliest lung biopsies taken, through early granuloma formation by postinoculation day 9, to eventual dissemination to abdominal viscera by 185 days after infection.

Radiographically demonstrable thoracic lesions appeared in eight to 21 days, and were similar to those observed in about 70 per cent of human patients; but a fan-shaped infiltrative pulmonary lesion peculiar to approximately 30 per cent of primary coccidioidomycosis in man was not observed in the thoracic radiographs.

Complement-fixation antibody appeared in serums from infected dogs within 28 to 36 days, but precipitins were not detected. Skin sensitivity to coccidioidin did not develop before postinoculation day 112.—[*Paul G. Hugenholtz, Raymond E. Reed, Keith T. Maddy, Robert J. Trautman, and James D. Barger: Experimental Coccidioidomycosis in Dogs. Am. J. Vet. Res., 19, (April, 1958): 433-439.*]

Coccidioidomycosis in the Horse—A Case Report

W. J. ZONTINE, D.V.M.

Lancaster, California

AN EXTENSIVE REVIEW of the literature through February, 1958, failed to reveal any reference to the occurrence of coccidioidomycosis in the equine species. In endemic areas of the southwestern United States and northern Mexico, coccidioidomycosis is a rather common disease in man, with an estimated 25,000 to 35,000 new cases occurring each year.[3]

In addition to its prevalence in man, it has also been reported as occurring in cattle,[12,15] sheep,[2,7,13,14] dogs,[1,4-6,8,11,16-19] chinchillas,[2] a gorilla,[9] and wild rodents[2] as a generalized infection. In swine, lung lesions develop but this species appears to be more resistant to a disseminated infection than other animals.[7] Experimentally, the organism has also been introduced into guinea pigs and rabbits.[7] The following case report deals in detail with the occurrence of coccidioidomycosis in the horse.

CASE REPORT

A chestnut American Saddlebred mare, 5 years of age, was treated for colic in January, 1954. At that time, a microscopic examination of the feces revealed a moderate infestation of strongyles, upon which a tentative diagnosis of verminous colic was made. The mare did not completely recover from this attack but exhibited intermittent abdominal spasms throughout the course of the ensuing four-month illness. She gradually became emaciated and developed a capricious appetite.

In March, 1954, two months following the initial attack, the following symptoms were observed: severe emaciation, supple skin, glossy coat, flared nostrils, petechial hemorrhages on the nasal mucosa, pale and slightly icteric conjunctival mucosa, rapid and weak pulse, temperature elevated 2 degrees, and respiratory rate of 40 per minute.

The front legs were strikingly edematous from the carpus downward, as were the hindlegs from the hock downward. In both areas, a sharp line of demarcation between the edematous and normal tissue was exhibited. The animal displayed a peculiar pointing attitude of the front feet, characterized by alternate extension of each foot as far as possible in a forward direction, which produced a slow weaving motion of the front quarters.

Upon rectal palpation, a large, tender, fluctuant mass was found firmly attached to the dorsal wall of the abdomen immediately anterior to the left tuber ilium. A needle was introduced into the mass via the rectum and blood was aspirated.

Aside from the initial treatment for colic, a therapeutic course of each of the following antibiotics and sulfonamides was given during the course of the illness, with no apparent improvement being evident: penicillin, streptomycin, combination of the two, chlortetracycline, oxytetracycline, sulfamethazine, and combinations of sulfapyridine and sulfathiazole. Blood transfusions, multiple vitamins, and crude liver extract were also administered as general supportive treatment.

The condition of the animal gradually deteriorated and she died in pain May 25, 1954. The postmortem examination revealed the following pathological changes.

The abdomen was filled with clotted blood. There were numerous large subcapsular hemorrhages in the liver, small granular abscesses in the parenchyma, and an extensive tear in the capsule.

The spleen was massive and firmly adherent to the dorsal and lateral walls of the abdomen immediately anterior to the left tuber ilium (the mass palpated rectally). Numerous abscesses were found scattered throughout the parenchyma of the spleen, one particularly prominent nodule measuring 10 cm. in its greatest dimension.

The lungs were infiltrated with irregular granular masses varying in size from nearly microscopic to 3 cm. in diameter. Areas

---

Dr. Zontine is a general practitioner in Lancaster, Calif.

The author acknowledges the assistance of A. M. Schumann, D.V.M., Palmdale, Calif., and W. F. Hughes, D.V.M., Niles, Calif. (formerly of Lancaster, Calif.), in the treatment of the horse; and Major J. A. Rehkemper, V.C., U.S.A.F., staff pathologist at the Armed Forces Institute of Pathology, Washington, D. C., who did the pathological work. In addition, the author is grateful to A. L. Dee, M.D., pathologist, and J. W. Birsner, M.D., radiologist, Antelope Valley Hospital, Lancaster, Calif., for their helpful criticism in the preparation of this manuscript.

of atelectasis and emphysema were also noticeable in the lungs.

The tissues were submitted for examination to the Armed Forces Institute of Pathology (AFIP accession 738613).

DISCUSSION

Coccidioidomycosis has a variety of names: valley fever, San Joaquin fever, desert fever, California disease, desert rheumatism, coccidioidal granuloma, and Posadas-Wernicke's disease. In addition to its occurrence in the endemic areas previously mentioned, it has been reported in animals in Kansas, Quebec, and Iowa.[18]

The causative organism, *Coccidioides immitis*, is a fungus of the Ascomycetes family which closely resembles an oocyst of a coccidium in appearance—hence the name, Coccidioides. The disease is commonly spread by means of arthrospores which enter the respiratory tract on inhaled dust particles. It can also be introduced by direct inoculation with infected objects such as thorns and by contamination of wounds.

This mare was foaled in 1949 in the San Fernando Valley, an area directly south of the Antelope Valley in southern California, and was transported to the Antelope Valley in 1951. She was never outside this immediate area which is climatically similar to, and adjacent to, the most endemic area of coccidioidomycosis in the United States, the southern San Joaquin Valley. All her feed was of local origin. The disease has been diagnosed, with laboratory confirmation, in 2 dogs native to the Antelope Valley (personal observation). Because of the dry, dusty conditions which usually prevail in this region, it is likely that the arthrospores were inhaled by the mare.

A diagnosis of equine infectious anemia was considered, since the syndrome ascribed to that disease closely resembled the phenomena observed in this mare. The rectal temperature, taken three times daily for two weeks, fluctuated erratically between 100 and 103 F. The laboratory reports (table 1), however, did not show the degree of anemia or leukopenia usually attributed to the chronic form of equine infectious anemia.[10] The moderate anemia, the pronounced leukocytosis, and the fluctuating temperature were more suggestive of a septicemia of bacterial origin.

Even during the necropsy, the possibility of coccidioidomycosis was not considered. Unfortunately, a detailed examination was not performed on tissues not obviously affected or on the tissues of the central nervous system. It is possible that the condition was even more widely disseminated than was apparent. No reason could be found for the ruptured liver, which was the immediate cause of death.

TABLE 1—Laboratory Report on a Mare Found to Have Coccidioidomycosis

Blood picture	March 26	April 1	April 13
Leukocytes/cmm. blood (thousands)	27	70	50
Erythrocytes/cmm. blood (millions)	5.4	5.2	5.2
Hemoglobin (Gm./100 cc. blood)	9.5	9.5	9.0
Sedimentation rate (Wintrobe method, 1 hour, corrected)	67 mm.	62 mm.	26 mm.
Packed cell volume	26 mm.	26 mm.	26 mm.
Differential blood count (100 cells counted):			
Neutrophils	.....	.....	88
Band cells	.....	.....	2
Lymphocytes	.....	.....	8
Monocytes	.....	.....	2
Urine culture	.....	.....	Negative for pathogenic organisms

SUMMARY

A clinical case of generalized coccidioidomycosis in a horse, believed to be the first report of the occurrence of this disease in the equine species, is described.

The main clinical features of the disease were: a course of four months, severe progressive emaciation, variable temperature, moderate anemia, pronounced leukocytosis, edema of the lower parts of the legs, and a peculiar pointing attitude of the front feet.

At necropsy, it was found that the animal had died from recent abdominal hemorrhage resulting from a ruptured liver. Granular abscesses of various sizes were seen scattered throughout the lungs, spleen, and liver. The diagnosis of generalized, equine coccidioidomycosis was made

by the Armed Forces Institute of Pathology.

References

[1]Ajello, L., Reed, R. E., Maddy, K. T., Budurin, A. A., and Moore, J. C.: Ecological and Epizootiological Studies on Canine Coccidioidomycosis. J.A.V.M.A., *129,* (Nov., 1956): 485-500.

[2]Anon: Merck Veterinary Manual. Merck and Co., Inc., Rahway, N. J. (1955): 464-466.

[3]Birsner, J. W.: The Roentgen Aspects of Five Hundred Cases of Pulmonary Coccidioidomycosis. Am. J. Roentgenol., *72,* (Oct., 1954): 556-573.

[4]Burger, C. H., and Levan, N. E.: Coccidioidomycosis in the Dog. J.A.V.M.A., *126,* (April, 1955): 297-301.

[5]Cordy, D. L., and Hoop, J. D.: Coccidioidomycosis of the Skeleton in a Dog. North Am. Vet., *34,* (1953): 44-46.

[6]Eville, T. B.: Case Report—Male Boxer. California Vet., *7,* (March-April, 1954).

[7]Hagan, W. A.: The Infectious Diseases of Domestic Animals. Comstock Publishing Co., Inc., Ithaca, N. Y. (1947): 370-374.

[8]Hage, T. J., and Moulton, J. E.: Skeletal Coccidioidomycosis in Dogs. Cornell Vet., *44,* (Oct., 1954): 489-500.

[9]Hoop, J. D.: Some Aspects of Coccidioidomycosis. California Vet., *9,* (July-August, 1956): 41-42.

[10]Hutrya, F., Marek, J., and Manninger, R.: Special Pathology and Therapeutics of the Diseases of Domestic Animals. Vol. 3. Alexander Eger, Chicago (1938): 74-100.

[11]Jasper, D. E., and Lewis, J. S.: Coccidioidomycosis in the Dog. North Am. Vet., *32,* (1951): 37-40.

[12]Maddy, K. T.: Coccidioidomycosis of Cattle in the Southwestern United States. J.A.V.M.A., *124,* (June, 1954): 456-464.

[13]Maddy, K. T.: Coccidioidomycosis in a Sheep. J.A.V.M.A., *124,* (June, 1954): 465.

[14]Newsom, I. E.: Sheep Diseases. Williams and Wilkins Co., Baltimore (1952): 88-89.

[15]Prchal, C. J.: Coccidioidomycosis of Cattle in Arizona. J.A.V.M.A., *112,* (June, 1948): 461-465.

[16]Reed, R. E.: Serology and Coccidioidin Skin Testing in Diagnosis of Canine Coccidioidomycosis. Proc. Book, AVMA (1954): 199-203.

[17]Reed, R. E.: Diagnosis of Disseminated Canine Coccidioidomycosis. J.A.V.M.A., *128,* (Feb., 1956): 196-201.

[18]Short, G. E., Schleicher, E. M., and Rice, W. M.: Coccidioidomycosis in a Kansas Dog. J.A.V.M.A., *127,* (Oct., 1955): 352-353.

[19]Spriegel, J. M., and Millif, J. H.: Coccidioidomycosis in a Dog. J.A.V.M.A., *112,* (March, 1948): 244.

Encephalitis and Hog Cholera

Nonpurulent encephalomyelitis was found on microscopic examination, in 111 of 445 swine examined. Hog cholera was diagnosed in 102 of these 111 animals, and paratyphoid, swine influenza, or swine erysipelas in the other 9; the lesions were less pronounced in the latter 9. Cholera was also diagnosed in 38 of the remaining 334 pigs [those with no nonpurulent encephalomyelitis].

In 114 other herds, in which cholera was suspected and in which the brains of 2 or more pigs were examined, encephalomyelitis was found in 40. Cholera was diagnosed in 37 of the 40 herds but not in the 3 others.—*Vet. Bull. (March, 1958): Item 765.*

Experimental Leptospirosis in Swine

Twenty swine were infected with *Leptospira pomona,* 17 by subcutaneous inoculation and 3 by contact with infected swine. Sixteen were infected with a Leptospira isolated from cattle, while 4 were infected with a strain obtained from hogs.

The only signs of infection were a mild elevation in temperature, a transient anorexia, and an almost imperceptible malaise in a few animals.

The blood cell values, hemoglobin levels, and blood nonprotein nitrogen values remained essentially normal for most animals throughout the investigation, with the exceptions of slight anisocytosis and reticulocytosis in 2 swine and a decrease in both erythrocytes and hemoglobin in 1 hog.

Leptospiremia was observed for as long as ten days after inoculation. In three instances, leptospiras were present in the blood at the time when serum antibody was demonstrable. Serum antibody was still present one year after exposure, although the highest titers occurred at three weeks.

The maximum number of leptospiras were excreted in the urine 20 to 30 days after exposure. The leptospiruria persisted in at least 2 swine for 122 days. The various factors influencing leptospiruria, e.g., urine pH and urinary *L. pomona* antibodies, were investigated. Urinary antibody was demonstrable after one year, but only weak reactions were observed. Highest titers were seen approximately three months after exposure.

Theories regarding leptospiral hemolytic anemia and production of urinary leptospiral antibody are discussed.

Weight gains of 10 infected swine were comparable to those observed for 10 uninfected litter mate controls.—[*E. V. Morse, D. C. Bauer, R. F. Langham, R. W. Lang, and D. E. Ullrey: Experimental Leptospirosis. IV. Pathogenesis of Porcine Leptospira Pomona Infections. Am. J. Vet. Res., 19, (April, 1958): 388-394.*]

Fescue Poisoning of Cattle on Florida Muck Land

GIBBS ASHLEY, D.V.M.

Winter Garden, Florida

It is the purpose of this report to record the occurrence of fescue poisoning (fescue foot) in cattle grazing on Kentucky 31 fescue, grown on muck soils in Florida near Astatula (central Florida).

The fescue pastures on which these animals were grazing had been established three to five years ago. Cattle had been grazed on them each year since that time. Fescue poisoning appeared in cattle on these pastures, in a mild form, three years ago. It also appeared in cattle grazing fescue on a muck pasture on a nearby farm. In both instances, it disappeared spontaneously without moving the cattle from the pasture.

Fig. 1—Loss of the medial hoof and third phalanx of the left foreleg of a steer, due to grazing fescue grown on Florida muck soil.

Fig. 2—Beginning dry gangrene in a steer, which resulted in loss of the "switch" of the tail.

Muck soils contain, by definition, from 20 to 50 per cent organic matter. Soils containing above 50 per cent organic matter are classified as peat. The other material, in addition to the organic matter, is sand and other mineral constituents. The pasture on which the animals became affected had not been fertilized in the fall of 1956, but fertilizer had been applied to the pasture in previous years.

There was a rank growth of the fescue at the time the cattle were turned onto it about March 1, 1957. Three groups of cattle, totaling 321 head, were turned into different lots of the same cross-fenced pasture. The cattle in one of the three groups were thin at the time they were turned onto the pastures and all of the severely affected animals except 1 were in

Dr. Ashley is a general practitioner in Winter Garden, Fla.

The author thanks Dr. William L. Sippel, Laboratories Division, Florida Livestock Board, Kissimmee, for his assistance in preparing this report.

this group. Signs of poisoning first appeared ten to 14 days after the cattle were turned onto the pasture.

Of the 171 steers in the group of thin cattle, 18 died and 15 others were affected in varying degrees of severity. Of the 18 that died or were killed, 4 lost one or more hoofs and 1 lost a third phalanx (fig. 1). The other 15 steers showed either slight or severe lameness and loss of the "switch" of their tails. Of the 150 steers in the other two groups, all were in good condition and only 15 developed a slight limp, but several lost the switch from the tail (fig. 2).

Twenty to 25 per cent of the animals that died showed a type of lesion on the legs in the area of the fetlock that suggested photosensitization (fig. 3).

Fig. 3—Skin lesion on the hindlegs of a steer, due to fescue poisoning; it is similar in appearance to a type seen in photosensitization. Notice loss of the medial hoof of the left foot.

No treatment was attempted and it was necessary to allow the steers to remain on the pasture, inasmuch as none other was available.

The owner was well satisfied with the gains in weight made by the steers not showing lesions of the disease.

Three things seem worthy of note in connection with this incident:

1) Fescue foot is reported in another climatic environment and on another type of soil—muck soil in Florida.

2) The animals in better physical condition were less severely affected than those that were in poor condition when turned onto the pasture.

3) Less severely affected animals recovered and new cases ceased to occur, even though the animals were not removed from the pasture. This suggests a transient occurrence of the toxic factor(s) in the forage or acquisition of resistance to the toxin by the animal, or both.

Traumatic Gastritis and Magnets

In 1957, traumatic gastritis was responsible for a large liver abscess (found on slaughter) in a bull and for the death of 2 cows in a herd of Guernseys in Ohio. Because of rusting wire fences and the difficulty in eliminating loose metal, administration of magnets was suggested as a "secondary line of defense."

After roughage had been withheld for 24 hours and each cow had been examined with a metal detector, magnets were given to the 32 in which metal was detected but not to the 2 in which metal seemed to be absent. The magnets used were 3 inches long, ½ inch in diameter.

[It is too early to form conclusions but no illness occurred in the next two months. An attempt is to be made to retrieve several magnets by rumenotomy, for examination.]

From another herd of 11 cows, 4 were sent to the Ohio State University Veterinary Clinic between January 11 and 17, 1958, where foreign bodies were recovered (penetrating the reticulum in 3) by rumenotomy. (Nails and metal had recently been spilled in the oats bin.) A Muffly metal retriever, an instrument with a cylindrical magnet on the end of a flexible stomach tube, was passed in 1 cow prior to surgery, resulting in the removal of two nails and miscellaneous small bits of metal. On rumenotomy, three free and two penetrating nails were recovered manually, from this same animal. One month later, all 4 cows had recovered and were producing normally.—*Speculum (Winter, 1958): 26.*

Transmitting Infection with a Syringe.—After injection of sterile saline solution into a culture of *Staphylococcus aureus*, the syringe was withdrawn, the needle changed, and a tube of sterile broth was inoculated. In several tests, the broth was contaminated. The bacteria apparently were drawn into the syringe through suction as the needle was removed.—*Vet. Bull. (Feb., 1958): Item 638.*

"Bawling Disease" in Calves

CURTIS C. STARKEBAUM, D.V.M.

Gunnison, Colorado

"Bawling disease" is the name applied by ranchers in this area to calves that, after birth, lie and bawl and seem unable to get up.

This condition was first noticed during the calving season of 1952 and has been recognized a number of times on various ranches in this area since then. The number of calves affected on any ranch may approach 1 per cent in one year—yet no calves will be affected in subsequent years.

Calves that are affected appear weak and limp, make little or no effort to get on their feet, and usually lie on their sternums with heads and necks extended or lie flat on their sides. The mucous membranes are cyanotic and the tongue is often swollen and thickened. They make low-throated, bawling noises and usually die within six hours.

Necropsy showed a heart defect, a patent foramen ovale (fig. 1, 2, 3). The membrane that covers the foramen has a limited attachment to the septum between the auricles; however, as much as one half the circumference of the membrane often is detached, allowing blood to flow either way. The membrane is nearly the size of a dime (1.0 to 1.5 cm. in diameter).

An open foramen ovale is normal in the fetal calf, as it functions to shunt the blood from the right auricle to the left auricle, allowing the blood to bypass the nonfunctional fetal lungs. Soon after birth, this opening should close sufficiently to establish the normal circulation through the heart but, due to the inability of this valve (valvula foraminis ovalis) to close, the heart action is impaired so that the affected calves nearly always die. The ductus arteriosus does not contribute to this impairment, as it has been closed, or nearly so, in the calves that have been necropsied.

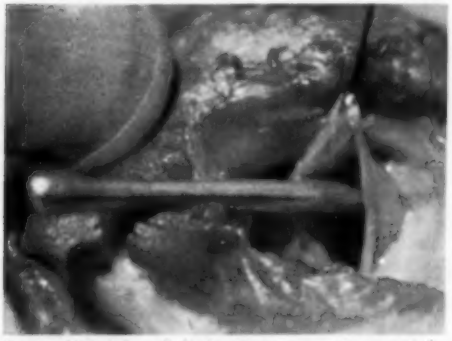


Fig. 1—Ventricles of the heart cut away to expose the left auricle, with probe inserted through the foramen ovale and with the membrane held away to show the opening.

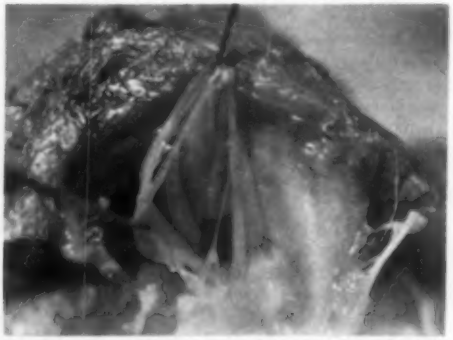


Fig. 2—The membrane (valvula foraminis ovalis) held away to show the opening and the membranous chord attachment to the septum between the left and right auricles.

These calves have been treated with calcium glucose solution and other supportive measures and, in some instances, they have lived—however, they probably would have lived without treatment.

Fig. 3—An apparently normal heart of a calf, 3 weeks old, showing the closed fossa ovalis, with the membrane pushed toward camera to show its attachment.

Dr. Starkebaum is a general practitioner in Gunnison, Colo.

Nutrition

Silage a Factor in Bovine Ketosis

The presence of ketone bodies in grass silage has been demonstrated. The ketone body content of silage from different silos may vary significantly, with particularly high levels occurring in grass silage which contains excessive quantities of butyric acid. In one instance, a high level of ketone bodies was found in corn silage. A direct relationship between the ketone body content of the silage fed and the frequency of ketosis in the herd was observed.

The incidence of ketosis ranged from 12 to 18 per cent. These animals responded poorly to the usual treatments, and relapses were frequent. Recoveries occurred after the grass silage was replaced with good quality hay. Ketogenesis in grass silage is an index to the quantity of butyric acid production within it. Clinical studies indicate that silage which contains butyric acid is a significant predisposing factor to ketosis.—[*J. H. Adler, S. J. Roberts, and J. A. Dye: Further Observations on Silage as a Possible Etiological Factor in Bovine Ketosis. Am. J. Vet. Res., 19, (April, 1958): 314-318.*]

Estrogen in Alfalfa Silage.—It had been reported that molasses preservation of alfalfa silage increased its estrogenic activity. In an experiment, neither the addition of 80 lb. of molasses nor 8 lb. of sodium bisulfite per ton of plant had a significant effect on the estrogenic content of the silage. Strains of alfalfa vary widely in natural content of estrogenic compounds, one of which is coumestrol. Alfalfa cut in the bud or one tenth bloom stage was more estrogenic than that cut at later stages.—*J. Dai. Sci. (March, 1958): 438.*

Rickets and an Osteodystrophy in Swine

Tissue sections were made from the distal epiphysis of the ribs of immature Iowa swine which showed an osteopathy, indicated by increased pliability of the rib shaft and enlargement of the distal rib epiphysis. Examination of the tissue sections revealed a widening of the zone of columns and the vesicular zone of the cartilage, suppressed cartilage breakdown, thin distorted trabeculae in the primary spongiosa, and aplasia and hypoplasia of the osteoblasts. The histological changes did not resemble those described as occurring in rickets.

Hog cholera virus, either as an infecting agent or immunizing agent, or the swine influenza virus were suggested as possible etiological agents. It also is suggested that the production of the disease by hog cholera virus may be dependent upon a partial vitamin A or calcium deficiency or both.—[*Aaron H. Groth: The Comparative Histopathology of Rickets and an Osteodystrophy in Immature Iowa Swine. Am. J. Vet. Res., 19, (April, 1958): 409-416.*]

The Rachitogenic Effect of Vitamin A.—The development of rickets in New Zealand lambs while on good green feeds was found to be due to a rachitogenic factor in the green growing leaves, while the antirachitic activity of plants was confined to dead leaves in which most of the plant pigment had been destroyed by weathering.

The rachitogenic factor was identified as carotene which had the same effect on rats as vitamin A.

Rickets was produced in lambs wintering on permanent pasture, by giving vitamin A representing 5 per cent of the maximum carotene intake from green feed; control lambs remained normal.—*Vet. Bull. (March, 1958): 855.*

Food Poisoning Due to Zinc.—Eight persons, in Britain, showed signs of illness within ten minutes to three hours after ingesting food which had either been soaked, cooked, or stored in galvinized containers after it was cooked. The zinc content in the food ranged from 31 to 5,000 p.p.m. but usually between 200 and 1,500 p.p.m. After vomiting, with or without nausea, the patients recovered rapidly. —*J.Am.M.A. (March 15, 1958): 1359.*

Feed Additives Fail to Control Enterotoxemia in Lambs.—In two trials at the University of Minnesota, with 185 good feeder lambs, tetra alkylammonium stearate (Dynafac—American Cyanamid Co., N. Y.), referred to as a chemobiotic, had a tendency to increase bloating during the first two weeks of one trial. The lambs were not vaccinated and were fed as much as they would eat. Enterotoxemia developed in 2 control lambs but also in 2 lambs fed the chemobiotic and in 1 lamb fed chlortetracycline.—*J. Anim. Sci. (Feb., 1958): 152.*

Veterinary Anatomy, A Crumbling Cornerstone

Guest Editorial

The timely editorial, "Inaccuracy for Art's Sake" in the JOURNAL (Feb. 1, 1958), on the slipshod anatomic illustrations in commercial brochures was music to the anatomist's ear.

The anatomic illiteracy deplored in that editorial will spread rapidly in the next few years if a small but doggedly persistent faction in veterinary education has its way. These people would like to reduce instruction in first-year anatomy to a handful of vague generalities. They argue that because the science of anatomy is venerable it must be obsolete; therefore, it is no longer necessary to teach the specific and detailed anatomy of each of the domestic animals.

The truth is that only the precise anatomy of the species under consideration is of any use to the veterinary practitioner, or to the student sweating over his physiology and pathology.

The attractive feature of infantile anatomy, from the administrative point of view, is that it can be taught by inexpensive help. A veterinarian with a Ph.D. in anatomy commands a starting salary of about $7,000 and is worth much more. Zoologists are easier to rope and not so hard to break and, having no personal interest in the veterinary profession, they do not raise embarrassing questions about the efficacy of the curriculum. They are content to teach a survey course and devote their free time to weird research projects.

Another administrative advantage of the superficial course in anatomy is the great reduction in cost of dissection material. With the modern tendency to admit about 20 per cent more students than the school's clinical facilities will accommodate, this is an important economic factor.

According to one plan, the class is divided into groups, each of which dissects a different species, and the students are naively expected to keep up with all their classmates' simultaneous dissections. This method may suffice for the teaching of elementary principles that the student should have learned in high school biology. Certainly in this country we can afford to provide every veterinary student with a chance to do his own dissection on a dog, a pig, a cow, a horse, and a fowl.

As the veterinary curriculum becomes more crowded by the advancements of science (and the much more importunate demands of the academic empire builders), the teaching time in anatomy will have to be decreased, making it more imperative that our anatomy teachers be first-rate veterinary scientists who are qualified to select from the great mass of anatomical facts those that are essential to the training of a veterinarian. Anyone can project slides of a given region or system; however, what we need is teachers who are competent to point out essentials and to place them in their proper perspective.

This favorable period of national reawakening to the dire necessity of sound fundamental education is no time for the veterinary colleges to sacrifice their basic sciences on the altar of expediency.—*Robert E. Habel, D.V.M., Ithaca, N. Y.*

"Equinus Departus"

The following is the first paragraph of an editorial in the *British Veterinary Journal* of May, 1957. It registers a nostalgic tone for the old-timers in the profession as well as recording an interesting comment on the sometimes frustrating change of pace, and of attitude toward responsibility, of modern man.

"The heavy horses of Britain, once the pride of the countryside and faithful slaves on the farms and roads, have come to fateful days. The urge for speed, the shortage of suitable manpower, and high wages are responsible for their decline in numbers and from favour. Probably the main factor for the dethronement from their erstwhile high estate is the want of suitable manpower. A modern young man does not set high value on any job which entails that he may be required to work beyond regulation hours, and especially so if it impinges upon the week-end. An automobile suits this inert mood. It is devoid of sense, feeling, or intelligence and offers no rebuke to its driver's conscience on being deserted at close of day."

Current Literature

ABSTRACTS

Estrogenic Stimulation in Anestrous Ewes

A three-year study of the sheep-breeding flocks at the Ohio Agricultural Experiment Station revealed that the spring lambing seasons were greatly extended when the ewes were pastured on Ladino clover or birdsfoot trefoil during the fall breeding. It was suspected that an estrogen-like substance was present in these legumes which interfered with conception. An effort was made to verify this by the study of vaginal smears stained by the Papanicolaou method.

Four pairs of virgin Columbia ewes were used. Smears were collected from one anestrous control pair before and after the injection of estrogen. Before injection, smears were thin, cells were scarce, and almost all cells were basophilic. After the injection of estrogen, smears were thick and masses of eosinophilic (cornified) cells were present.

Smears from the other control pair were collected throughout an entire normal estrous cycle. In proestrus, the smear was thin and clear and only a few basophilic cells were present. In estrus, cells were few in number, with one third of these being eosinophilic (cornified). In metestrus and diestrus, smears were thick, cheesy, and white. Masses of desquamated cells were present and almost all were cornified.

Smears of the anestrous ewes pastured on Ladino clover and birdsfoot trefoil were also heavy, thick, and cheesy and contained masses of cornified epithelial cells, closely resembling the smears from the estrogen-treated, anestrous control ewes and the smears from the metestrous and diestrous phases of a normal estrous cycle from the other control ewes.

It is suggested that an estrogen-like substance is present in Ladino clover and birdsfoot trefoil which is probably the agent that interfered with conception during the breeding season.—[*V. L. Sanger, P. H. Engle, and D. S. Bell: Evidence of Estrogenic Stimulation in Anestrous Ewes Pastured on Ladino Clover and Birdsfoot Trefoil, as Revealed by Vaginal Smears. Am. J. Vet. Res., 19, (April, 1958): 288-294.*]

Effects of Feeding Fluorine to Dairy Cattle

Adult Holstein-Friesian cattle, maintained under practical farm conditions and kept at a high rate of milk production, were fed levels of sodium fluoride ranging from 0.15 to 2.5 mg. of fluorine per kilogram of body weight per day for six years. Milk production, inseminations per conception, days in gestation, percentage of live births, and rate of growth were not influenced by the level of fluorine used. The deposition of fluorine in bone and cartilage was the most reliable indication of the levels of fluorine ingested. Soft tissues did not store appreciable amounts of fluorine.

Although there were no occurrences of hoof elongation or diarrhea, there were frequent appearances of unthriftiness, roughened coats, and occasional lameness of cows fed 2.0 and 2.5 mg. of fluorine.

The results of this study suggest that 2.0 to 2.5 mg. of fluorine per kilogram of body weight per day is the level at which toxic effects may be expected to occur after periods of prolonged ingestion.—[*G. W. Newell and H. J. Schmidt: The Effects of Feeding Fluorine, as Sodium Fluoride, to Dairy Cattle—A Six-Year Study. Am. J. Vet. Res., 19, (April, 1958): 364-376.*]

Staphylococcic Alpha Toxin

The dermonecrosis produced in rabbits with staphylococcic *alpha* toxin is ischemic in nature and apparently is caused by the vasoconstricting action of the toxin. The intravenous injection of trypan blue showed that the dye was excluded partially from some lesions as early as 15 minutes after the toxin was injected intradermally, and completely excluded in all lesions 30 minutes old or older.

Mature cows were found susceptible to the dermonecrotizing action of the toxin; thus, the toxin probably acts in a similar manner to produce gangrenous mastitis. Dermonecrosis could not be inhibited by the sectioning of the sciatic nerve or by the use of procaine, N-phenoxyisopropyl-N-benzyl-β-chloroethylamine hydrochloride (Dibenzyline), tetraethylammonium chloride, and histamine.

These results are interpreted as indicating that the toxin probably acts directly on the blood vessels to produce vasoconstriction, rather than indirectly by stimulation of vasoconstrictor nerve fibers. Because paralytic signs are seen in the hindlegs of some cows with fulminating or gangrenous staphylococcic mastitis, toxin was injected epidurally in a 7-month-old bull calf and a 2-year-old heifer to determine if similar signs could be produced experimentally. The results were negative, although three factors were considered which might have prevented the toxin from showing neurotoxic properties. A vasospasm of the blood vessels of the hindlegs resulting in an ischemic type of paralysis was considered as a possible explanation for the clinical signs that appear to be neurogenic.—[*Richard W. Brown and R. K. Scherer: A Study of the Necrotizing Action of Staphylococcic Alpha Toxin. Am. J. Vet. Res., 19, (April, 1958): 354-362.*]

Control of Chronic Respiratory Diseases

Proposed methods for the control of chronic respiratory disease (CRD) have the ultimate aim of eradicating pleuropneumonia-like organism (PPLO) infections from breeding stock. Segregation of breeders into positive and negative birds on basis of PPLO serological tests was not found practical.

Young breeder units may be subjected to serological sampling and nearly negative units designated for parenteral treatment with streptomycin products. Parenteral treatment for breaking the

transovarian infective cycle of PPLO is not standardized; its necessity is not established and, in general, should be held to a minimum.

Repeated parenteral treatment of parent stock produces broiler chicks with low liability toward CRD which have an advantage over PPLO-infected chicks of 1.3 cents per pound. Chicks for replacement stock should come from nearly negative parent stock, kept in relative isolation in 500-bird units, and mated with males from negative pens. At 8 to 10 weeks of age, negative units should be selected by 10 per cent serological sampling, and then subjected to bimonthly total blood tests and representative cultural tests by tracheal swabs. Increased ventilation seems to decrease spread of PPLO under experimental and field conditions.

Superinfection with infectious bronchitis virus (and probably other agents) intensifies and prolongs PPLO infection. Under natural conditions, avian PPLO occur as hemagglutinating and nonhemagglutinating types, of which the latter are of low pathogenicity and considered serological loss-variants. Neither type is found in known PPLO-free stock.—[*E. L. Jungherr: Symposium on Chronic Respiratory Diseases of Poultry. IV. The Control of Chronic Respiratory Disease. Am. J. Vet. Res., 19, (April, 1958): 464-467.*]

Urinary Estrogens of the Pregnant Sow

After acid hydrolysis and extraction of pregnant sows' urine, a Kober chromogen was isolated in the estrone fraction. After methylation, the substance showed behavior identical with estrone-3-methyl ether when subjected to chromatography on alumina according to Brown (*Biochem. J., 60,* 1955: 185). The isolated, methylated substance showed absorption maximum at the same wave length as pure estrone-3-methyl ether (516-518 mμ), using a modified Kober reagent.

By use of the Brown method for chemical determination of urinary estrogens, no significant amounts of estriol and estradiol could be detected. It is concluded that estrone is the main estrogenic hormone excreted with the urine in late pregnancy in this species.—[*Weiert Velle: Urinary Estrogens of the Pregnant Sow. Am. J. Vet. Res., 19, (April, 1958): 405-408.*]

PPLO of Avian Origin

The literature on the isolation and identification of pleuropneumonia-like organisms (PPLO) of avian origin is reviewed briefly, and the techniques used at the University of California are given in detail. The occurrence of serological and pathological variations found in earlier investigations are described.

Pleuropneumonia-like organisms that did not produce disease in birds were observed. They were not related serologically to the standard pathogenic strain (S$_1$) which was isolated from turkeys and which has been used widely for antigen production. Some strains of the pathogenic type failed to grow on agar.

A number of PPLO isolated from newly hatched poults with aerosacculitis did not ferment carbohydrates. These isolations were of one type and were not related antigenically to the standard pathogenic strain.—[*H. E. Adler, Julius Fabricant, R. Yamamoto, and J. Berg: Symposium on Chronic Respiratory Diseases of Poultry. I. Isolation and Identification of Pleuropneumonia-like Organisms of Avian Origin. Am. J. Vet. Res., 19, (April, 1958): 440-447.*]

BOOKS AND REPORTS

Aids to Public Health

The eighth edition of this volume reflects the tendency of public health to become more closely related to medical practice in Britain. It was written for medical students and others preparing to enter the public health field.—[*Aids to Public Health. By Llywelyn Roberts. 8th ed. 335 pages. Williams and Wilkins Co., Mount Royal and Guilford Aves., Baltimore 2, Md. 1957. Price $3.00.*]

Lecture Notes on the Use of the Microscope

This elementary manual includes sections on the components of the microscope, the theory of the instrument, practical instruction on its use and the care and use of research-type instruments. No major changes were made in this second edition, but several portions were corrected or clarified.—[*Lecture Notes on the Use of the Microscope. 2nd ed. By R. Barer. 76 pages. Illustrated. Charles C Thomas, 301-327 East Lawrence Ave., Springfield, Ill. 1957. Price $1.50.*]

Atomic Energy in Agriculture

A British author presents background material on the uses, present and future, of atomic energy in the agricultural sciences. He devotes chapters to plant mutation by the use of atomic radiation, radioactive labeling of elements to trace their distribution in plants, animals, and the soil, the use of radioactive materials to destroy pests, and the preservation of food by radiation. The book should interest the general scientific reader.—[*Atomic Energy in Agriculture. By William E. Dick. 150 pages. Illustrated. Philosophical Library Inc., 15 East 40th St., New York 16, N. Y. 1957. Price $6.00.*]

Poison on the Land

A British writer deplores the use of toxic farm chemicals and their effects, direct, indirect, and conjectured, in his country. The book contains chapters on myxomatosis in rabbits, the problems of foxes and rats, pollution of rivers, and birds and farmers.—[*Poison on the Land. By J. Wentworth Day. 234 pages. Philosophical Library Inc., 15 E. 40th St., New York 16, N. Y. 1957. Price $6.00.*]

THE NEWS

Sixteenth International Veterinary Congress to Be Held in Madrid

Dates — May 21-27, 1959

Announcement was recently received from the Organizing Committee for the XVIth International Veterinary Congress that arrangements are under way for the sessions that will be held in Madrid, Spain, on May 21-27, 1959. The secretary general of the Congress, Prof. Pedro Carda, has sent letters to all national committees and associations of specialists affiliated with the I.V.C., requesting that they submit suggested topics, and the names of qualified reporters to discuss them, for the scientific program of the Congress. From these suggested topics and nominations, the Organizing Committee will select the subjects and speakers for the official program.

U. S. Committee Appointed and Working

Having anticipated the request from the Organizing Committee, Dr. W. A. Hagan, U.S. member of the Permanent Committee of the I.V.C., some time ago requested the AVMA Executive Board to help select a representative committee of U.S. veterinarians to work with the Organizing Committee in Spain. The U.S. Committee comprises

Dr. R. L. Anderes, *Veterinary Medicine*
Dr. W. W. Armistead, AVMA
Dr. E. C. Chamberlayne, Pan American Sanitary Bureau
Dr. M. R. Clarkson, Agricultural Research Service, U.S.D.A.
Dr. W. H. Eyestone, National Institutes of Health
Dr. Robert Getty, AVMA Research Council
Dr. R. A. Hendershott, U.S. Livestock Sanitary Association
Dr. D. E. Jasper, School of Veterinary Medicine, University of California
Dr. A. G. Karlson, Conference of Research Workers
Dr. J. V. Lacroix, *North American Veterinarian*
Dr. E. E. Leasure, Association of Veterinary Deans
Brig. Gen. J. A. McCallam, AVMA
Col. R. R. Miller, Veterinary Corps, U.S. Air Force
Dr. W. T. Oglesby, Veterinary Division, Land-Grant College Association
Dr. Carl Olson, Jr., AVMA Committee on Nomenclature, University of Wisconsin, Madison
Dr. R. E. Rebrassier, AVMA
Dr. W. H. Riser, American Animal Hospital Association
Dr. J. H. Steele, U.S. Public Health Service
Brig. Gen. E. W. Young, Veterinary Corps, U.S. Army

Dr. W. A. Hagan is chairman of the committee and Dr. J. G. Hardenbergh is secretary.

Several members of the Committee met in Washington on April 23 and began its work of assembling suggested program topics and reporters from this country to be nominated to present them at the Madrid Congress.

The scientific program of the Congress will be presented under five principal section headings and 19 subsection subject heads. In addition, two general subjects will be discussed: "Atomic Energy and Veterinary Science" and "The Social Mission of Veterinary Science and Practice."

Future issues of the Journal will contain further program details and other information about the Madrid Congress that is received from the Organizing Committee. Its officers include Dr. Ramon E. Alcazar, general chairman; Dr. Salvador W. Lomena, co-chairman; Dr. Cesareo S. Egana, Prof. Carlos L. deCuenca and Dr. Francisco Polo J., vice-chairman; Dr. Manuel Rabaual L., treasurer; Prof. Pedro Carda A., secretary-general; Dr. Antonia F. Mateos, assistant secretary.

Tours to Madrid and Other European Points to be Offered

The U.S. Committee is arranging with a tour agency to offer a selection of group travel plans to Madrid and other points of interest in Europe. As soon as these arrangements are completed, they will be widely publicized.

Change in A.F.I.P. Policy for Veterinary Pathological Specimens

In compliance with recent recommendations of the AVMA Committee on the Registry of Veterinary Pathology, the Armed Forces Institute of Pathology has announced a modified policy regarding the submission of veterinary pathological specimens. After June 30, 1958, animal tissues should be contributed only by, or through, veterinary pathologists as is the custom with medical and dental case material.

During the development of the Registry of Veterinary Pathology, it was essential to accumulate pathological animal material from veterinary practitioners. In exchange for this material, the Veterinary Section provided diagnostic and consultation services. The many scientific articles, books, and study sets inspired by this collection attest to the value of the specimens submitted.

The AFIP provides consultative service in human pathology exclusively through pathologists. The Registry Committee and the A.F.I.P. agree that, in view of the development of veterinary pathology as a recognized specialty and the increasing number of civilian patholo-

gists, the time has arrived for veterinary pathology to conform to the pattern followed in human pathology, in so far as contribution of pathological material to the A.F.I.P. is concerned.

Tissues from pathologists should be forwarded to the Armed Forces Institute of Pathology for review and consultation only when they meet the following criteria:

1) when the pathologist believes that the case is a worthwhile contribution to the Registry of Veterinary Pathology for teaching or research;
2) when the Armed Forces Institute of Pathology may provide consultative diagnostic service to the pathologist.

The new policy will permit the Veterinary Section to render more prompt consultative service to pathologists, exercise more selectivity in collecting specimens, utilize the collection for more long-range contributions to veterinary pathology, conduct a more intensive training program, and permit the assignment of A.F.I.P. veterinary pathologists to military research problems.

Veterinary Radiological Health Course Held

The Oak Ridge Institute of Nuclear Studies conducted two classes for veterinarians in March, 1958, in cooperation with the University of Tennessee-Atomic Energy Commission Agricultural Laboratory and the Army Veterinary Corps.

The two-week course, which provided indoctrination in radiological health, was specifically designed to furnish instruction in the evaluation of problems of radiation phenomena, particularly in relation to their biological effects and the possible or potential factors involved in the radiocontamination of food-producing animals or animal food products.

AMONG THE STATES AND PROVINCES

Alabama

Dr. Bailey Awarded Fellowship.—Dr. W. S. Bailey, head professor of the Department of Pathology and Parasitology, School of Veterinary Medicine, Alabama Polytechnic Institute, has been awarded a science faculty fellowship by the National Science Foundation for a year's work in the Philippine Islands. This fellowship is awarded on the basis of demonstrated and potential ability as a university science teacher, and the primary purpose of the award is to provide an opportunity for college and university science teachers to enhance their effectiveness as teachers.

Dr. Bailey's program in the Philippine Islands will consist of research work, teaching, and field study at the University of the Philippines, where he has been appointed visiting professorial lecturer in the College of Veterinary Medicine.

Dr. W. S. Bailey

His research will consist of studies on the biology of *Spirocerca lupi*, the esophageal worm of dogs. This parasite, quite common in the southern United States, has been incriminated by Dr. Bailey and his associates as a cause of malignant neoplasms of the esophagus of the dog. Field studies of livestock diseases, primarily parasitic diseases, will be in cooperation with Drs. P. G. Refuerzo and D. J. Cabrera of the Philippine Department of Agriculture's Bureau of Animal Industry, both of whom have studied at the Alabama Polytechnic Institute during the past three years. Dr. Bailey will take a large number of color slides for use in the teaching program at the School of Veterinary Medicine at A.P.I.

Dr. Bailey will probably begin his program in the Philippines Oct. 1, 1958, or Jan. 1, 1959. He plans to take his family (wife and four children) with him to the Philippines.

• • •

Central Alabama Association.—The Central Alabama Veterinary Medical Association met in Montgomery at the Sahara Restaurant April 3, 1958. A social hour and dinner preceded the meeting at which Dr. B. M. Lauderdale presided. Dr. Donald Stamm, veterinarian with the Public Health Service, Virus, and Rickettsial Laboratory of Montgomery, spoke on his recent work with encephalitis.

s/WILLIAM H. WATSON, JR.,
Public Relations Committee.

Connecticut

Fairfield County V.M.A.—The regular dinner meeting of the Fairfield County V.M.A. was held April 9, 1958, at Cafe Barna in Westport. The guest speaker was Dr. J. Markowitz of the University of Toronto, formerly with the Mayo Foundation, Rochester, Minn. Author of the "Textbook of Experimental Surgery," the title of his talk was "Some Recent Advances in Animal Surgery."

He discussed the mechanics of inducing hypothermia in a dog, the four blood groupings in the dog, and the use of the artificial heart and artificial kidney. He also spoke of the recent advances in the transplanting of organs from one animal to another of the same or of different species.

Dr. Markowitz concluded with the subject of inoperable cancer; he demonstrated an operation to remove the hypophysis.

s/WILLIAM R. LEGGETT, *President.*

District of Columbia

Antibiotics Symposium to be Held in Fall.—The journals, *Antibiotics and Chemotherapy* and *Antibiotic Medicine & Clinical Therapy*, are sponsoring the sixth symposium on antibiotics, which will be held on Oct. 15-17, 1958, at the Willard Hotel in Washington, D. C.

Contributors to the 1958 symposium may submit abstracts and manuscripts to Dr. Henry Welch, director, Division of Antibiotics, U.S. Department of Health, Washington 25, D.C. Manuscripts must contain new, previously unpublished material. September 15 is the deadline for the submission of manuscripts, while September 1 is the closing date for abstracts.

Indiana

Northwest Indiana Association.—The newly elected officers of the Northwestern Indiana V.M.A. for the ensuing year are: Drs. Joseph Sewell, Crown Point, president; Gordon Johnson, Lafayette, vice-president; and Dr. Robert Becker, Rensselaer, secretary.

s/J. R. TAYLOR, *Secretary-Treasurer.*

Iowa

Leptospirosis Symposium Held in Sioux City, May 15.—A symposium on leptospirosis, jointly sponsored by the Woodbury County Medical Society and the Interstate V.M.A., was held at the Hotel Mayfair, in Sioux City, on May 15, 1958. This is the annual meeting of these two associations.

A lecture on "Leptospirosis in Man" was presented by Dr. Franklin H. Top of the School of Medicine, University of Iowa. Dr. S. H. McNutt of the Department of Veterinary Science, University of Wisconsin, spoke on "Leptospirosis in Animals."

Dr. Charles D. Cox, School of Medicine, State University of South Dakota, led the discussion on the "Recent Advances in the Laboratory Diagnosis of Human Leptospirosis." Dr. Paul Bennett, School of Veterinary Medicine, Iowa State College, was in charge of the discussion on "Recent Laboratory Findings in Animal Serums."

Both the lectures and the discussions were illustrated.

• • •

Dr. M. J. Eggert Named Head Pathologist, U.S.D.A. Diagnostic Laboratory.—Dr. Matthew J. Eggert has been appointed head pathologist in charge of the Animal Disease Eradication Division's Interim Animal Diagnostic Laboratory at Iowa State College, Ames, effective Dec. 2, 1957.

Dr. Eggert was formerly associated with the Virginia State Department of Agriculture and the office of the state veterinarian in Richmond, Va.

His new responsibilities in Ames include the supervision of laboratory services in the fields of diagnostic bacteriology, virology, serology, and histopathology; planning and development of the laboratory phases of epizootiological studies of brucellosis, tuberculosis, scrapie, trichinosis, and other animal dieases of national interest; and assisting in the planning of the U.S.D.A.'s Animal Disease Laboratory at Ames, to which the interim diagnostic laboratory will later be transferred.

Dr. Eggert received his D.V.M. from Ohio State University in 1933, and his M.S. in 1935. He plans to pursue further graduate studies in the veterinary pathology department of Iowa State College.

He is a member of Phi Zeta, Virginia Academy of Science, Research Workers in the Southern States, the A.V.M.A., and the Virginia V.M.A.

Kansas

Kansas City Association.—The regular meeting of the Kansas City V.M.A. was held April 17 at the Hotel President. Dr. James H. Steele, chief, Communicable Disease Center, U.S.P.H.S., Atlanta, Ga., showed slides and commented on his recent trip through Poland and Czechoslovakia. Sponsored by the National Institutes of Health, his trip included various scientific and veterinary institutions in these Iron Curtain countries.

He discussed the comparison of research between that of the United States and of communist countries as well as differences in the approach to science.

s/FRANK O'DONNELL, *Secretary*

• • •

Scholarship Awarded.—Sidney Robert Jones, a Kansas State College veterinary freshman from Leavenworth, has been awarded a

William H. Danforth scholarship for two weeks of leadership training at the American Youth Foundation camp at Camp Miniwanca, Stony Lake, Mich., August 11-24.

He is the son of Dr. and Mrs. W. L. Jones of Leavenworth.

Michigan

Dr. Lewis A. Wileden (left), the first graduate (1913) of the College of Veterinary Medicine at Michigan State University, receives a distinguished service citation at the thirty-fifth annual postgraduate conference for veterinarians at Michigan State's Kellogg Center.

Presenting the award is Dr. H. J. Stafseth (right), professor emeritus and head of the M.S.U. department of microbiology and public health. Mrs. Wileden looks on.

• • •

State Association.—The Michigan Veterinary Medical Association will hold its annual meeting at the Grand Hotel, Mackinac Island, on June 2-4, 1958.

Among the topics for discussion will be "Vacuums, Pulsations, Mastitis and You," "The Acute Abdomen in Small Animals," "Handling Those Horse Calls," "New Concepts in Hog Cholera," and "Canine Pancreatitis."

s/ROBERT F. WILLSON, *Secretary.*

New York

Caspary Estate Makes Additional Grant for Veterinary Research.—The estate of Alfred H. Caspary has made a grant of approximately $3,000,000 to the Margaret M. Caspary Institute for Veterinary Research maintained by the New York Women's League for Animals. The grant is in addition to the $3,000,000 given to the League by the Caspary estate in 1955 to establish the Institute in memory of Mrs. Caspary, who for many years served as a director of the League.

The research program of the Institute will embrace study for all major facets of disease in small animals.

The League's executive committee has elected three new directors: Paul Abbott of Glore, Forgan & Co., president of the Southampton Hospital; Alfred L. Rose of Proskauer, Rose, Goetz & Mendelsohn, former president of Mount Sinai Hospital; and Col. Richard H. Tatlow III, president, Abbott, Merkt & Co.

Saskatchewan

A Veterinary School for Saskatchewan?—The University of Saskatchewan planning committee has recommended that a veterinary college be established there ". . . to supply the future needs of the rapidly growing livestock industry . . . ."—*Vet. Rec.* (*March* 8, 1958) : 218.

Texas

Eleventh Annual Conference for Veterinarians.—The eleventh annual conference for veterinarians will be held at the Memorial Student Center, A. & M. College of Texas, College Station, on June 4-6, 1958. Sponsored by the School of Veterinary Medicine at Texas A. & M., the meeting will include a series of discussions, as well as surgical and clinical demonstrations, at the veterinary hospital on campus.

Three films will be shown: "Foot and Mouth Disease Outbreak in Canada," "Brucellosis Ring Test," and "Second Sight." The topics to be discussed will be "Regulatory Problems," by Dr. L. R. Noyes, Fort Worth; "General Horse Practice" and "Lameness in the Horse" by Dr. Alan H. Edmondson of Pasadena, Calif. Dr. E. F. Ebert of the University of Missouri will speak on large animal practice problems and cattle surgery, and Dr. Hugh Cartrite of Gonzales will give tips on poultry practice.

"Clinical and Surgical Short Cuts" and "Diseases of the Eye" will be discussed by Dr. Harlan E. Jensen of University Heights, Ohio; Dr. Raymond E. Reed, University of Arizona, will preset a lecture on "Canine Coccidioidomycosis;" and Dr. F. A. Todd, U.S.D.A., Washington, D.C., will discuss the agricultural uses of atomic energy.

Members of the Texas A. & M. faculty will speak on the following subjects: Dr. William M. Romane will present a study of the electroejaculation of the bull, and the relaxation of retractor penis muscles of cattle with Promazine hydrochloride; Dr. C. W. Schulz will demonstrate the use of Succostrin hydrochloride in equine castration, and the German technique and instruments used in rumenotomy.

Dr. A. A. Lenert will present a study of regional anesthesia by nerve blocking in large animals, and Dr. Patrick L. Hubert will dem-

onstrate the manual extrusion of the eyeball in cattle.

The intraovarian injection of gonadotropin hormones in cattle and median patellar desmotomy in cattle will be discussed by Dr. Fred C. Neal; "Gadgets and Shortcuts in the Small Animal Practice" and "Intermeduallary Transfusions in Small Animals" will be the subjects for two demonstrations by Dr. R. J. Beamer. Dr. J. P. Davis will discuss the anterior cruciate ligament repair in dogs.

Dr. Jensen of Ohio will conduct a mandibular fracture repair, and Dr. Ebert of Missouri will present a study of the median patellar desmotomy in the horse. A joint demonstration, "Injecting Opaque Material in Subarachnoid Space (Cisterna Magna)," will be given by Dr. Davis and by W. C. Banks of Texas A. & M. College.

Drs. A. I. Flowers, C. M. Patterson, and R. R. Bell of the Texas faculty will be acting chairmen for the various sessions.

Virgin Islands

Virgin Islands V.M.A. Elects Officers for 1958.—At a meeting on April 2, 1958, of the Veterinary Medical Association of the Virgin Islands which was first organized in February, 1957 (*see* JOURNAL, May 1, 1957, pp 425-426), Dr. L. A. Fahlund (MSU '40) was elected president and treasurer and Dr. C. C. Crago (OSU '30) was elected vice-president and secretary for the ensuing year. The association expects to send a delegate to the AVMA convention each year.

s/C. C. CRAGO, *Secretary.*

FOREIGN NEWS

Guatemala

School of Veterinary Medicine and Zootechnics Established.—Announcement was recently made of the establishment of the School of Veterinary Medicine and Zootechnics at the University of San Carlos, Guatemala. Inauguration of teaching was scheduled to begin in February, 1958. Of the 54 students enrolled, 30 are first-year basic and 24 are second year.

The Guatemala school is the first, and only, veterinary school in Central America.

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. are reported as of January, February, March 6, 10, 27, 31, April 3, and 4, 1958.

TRANSFERS

Edward A. Bassinov, from Roxboro, N. Car., to Concord, N. Car.

Adam Betsch, from Knoxville, Tenn., to Greenwood, S. Car.

George W. Bierbower, from Dallas, Texas, to Russellville, Ark.

Ralph L. Bishop, from Wichita, Kan., to Omaha, Neb.

James H. Brink, from Utica, N. Y., to Cincinnati, Ohio.

Ben A. Brinkman, from Worthington, Minn., to Gainesville, Ga.

Addison Blair, from Chicago, Ill., to Elburn, Ill.

John A. Chandler, from Gainesville, Ga., to Lumberton, N. Car.

Charles D. Chase, from Tripoli, Iowa, to Worthington, Minn.

John L. Cherry, from Gainesville, Ga., to Raeford, N. Car.

Truman W. Cole, from Washington, D. C., to Jacksonville, Fla.

James R. Collins, from Ft. Worth, Texas, to Houston, Texas.

William F. Daut, Jr., from Arkansas City, Kan., to Spokane, Wash.

Arthur F. Dolby, from Nashville, Tenn., to Chicago, Ill.

Seth B. Donelson, from Dallas, Texas, to Lampasas, Texas.

William F. Dossey, from Fulton, Calif., to Washington, D. C.

Harry E. Engelhardt, from Osgood, Ind., to Gainesville, Ga.

J. J. Featherstone, from Montpelier, Vt., to St. Louis, Mo.

Charles Gilvarg, from Boston, Mass., to Sutton, Mass.

Leonard B. Gray, from Chicago, Ill., to Athens, Ga.

Carl D. Griffin, from Houston, Texas, to Greenville, S. Car.

George Harner, from St. Louis, Mo., to Atlanta, Ga.

Albert L. Havlik, from Worthington, Minn., to Center, Texas.

Vincent Held, from Rio Linda, Calif., to Moorpark, Calif.

Biagio Infranco, from Baltimore, Md., to Pokomoke, Md.

Charles M. Johnson, from Gainesville, Ga., to Morton, Miss.

D. W. Johnson, from Lansing, Mich., to Detroit, Mich.

Walter T. Juzwiak, from Denver, Colo., to Cleveland, Ohio.

Samuel Kelsall, III, from Memphis, Tenn., to Houston, Texas.

James D. Lane, from S. St. Paul, Minn., to Memphis, Tenn.

Byron N. Lauderdale, Jr., from Woodland, Calif., to Chicago, Ill.

Forrest C. Love, from Turlock, Calif., to Washington, D. C.

Robert D. Lozo, from Dallas, Texas, to Waco, Texas.

Robert D. McIelwain, from Nephi, Utah, to Georgetown, Del.

William F. McKeller, from Springfield, Mass., to Malone, N. Y.

J. J. Masterson, from Sutton, Mass., to Auburn, Mass.

John E. Murphy, from Elburn, Ill., to Eau Claire, Wis.

Philip G. Papish, from Seattle, Wash., to Kent, Wash.

Harry L. Phillips, from Chicago, Ill., to Dallas, Texas.

Clifton J. Shepler, from Ft. Worth, Texas, to Dallas, Texas.

Robert A. Stahnke, from S. St. Paul, Minn., to New York, N. Y.

Boris Sulima, from Millsboro, Del., to Salisbury, Md.

Donald D. Tolley, from Watertown, S. Dak., to S. St. Paul, Minn.

K. D. Welty, from Columbus, Ohio, to Bellefontaine, Ohio.

RETIREMENTS

Leo J. Cook, Baltimore, Md.

Clarence A. Dionne, Los Angeles, Calif.

Fred Fischer, Boise, Idaho.

T. T. Genre, Columbus, Ohio.
Guy S. Jackson, Salem, Va.
Robert E. Moody, Birmingham, Ala.

DEATHS

Harry J. Cairns, Waco, Texas.
William G. Guth, Albuquerque, N. M.
Charles T. Windrath, Worthington, Minn.

STATE BOARD EXAMINATIONS

Interested persons can obtain information about applications, fees, deadlines for filing applications, and exact time and place of examinations of the respective boards by writing to the persons whose names and addresses are given below.

BRITISH COLUMBIA—June and November, 1958 (usually end of the second week); Vancouver. G. L. Stovell, British Columbia Veterinary Association, 3187 West 43rd Ave., Vancouver 13, secretary.

CALIFORNIA—June 9-11, 1958, School of Veterinary Medicine, University of California, Davis, Calif.

DISTRICT OF COLUMBIA—June 26, 1958, Department of Occupations and Professions, 1740 Massachusetts Ave., N.W., Washington, D.C. A. F. McEwan, secretary, 1740 Massachusetts Ave., N.W., Washington 6, D.C.

FLORIDA—June 16-17-18, 1958, Biscayne Terrace Hotel, Miami. Dr. E. L. Matthews, secretary, Box 141, Palatka, Fla.

INDIANA—July 8-9, 1958, House of Representatives, State House, Indianapolis, Ind. Joe W. Green, secretary, Room 413, 611 N. Park Ave., Indianapolis 4, Ind.

IOWA—June 16-17, 1958, Office of the Division of Animal Industry, State House, Des Moines, Iowa. A. L. Sundberg, chief, Division of Animal Industry, Des Moines, Iowa.

KENTUCKY—July 28, 1958. University of Kentucky, Lexington. J. K. Bushnell, secretary, 229 Houston, Paris, Ky.

MAINE—July 7-8, 1958, State House, Augusta, Maine. E. C. Moore, secretary, Turner Center, Maine.

MARYLAND—June 18, 1958, written examination; June 19, 1958, practical examination; College Park, Md. Harold S. Gober, secretary, 5400 Park Heights Ave., Baltimore 15, Md.

MASSACHUSETTS—June 26-27-28, 1958, Amherst. Dr. Edward A. Blake, secretary, Room 33, State House, Boston, Mass.

MICHIGAN—June 9-10, 1958, Lansing, Mich. Written, practical, and oral examinations. Applications must be on file at least 15 days before examination, accompanied by $25 fee. Address: State Veterinarian, 641 Lewis Cass Bldg., Lansing 13, Mich.

MISSISSIPPI—June 17, 1958, Jackson, Miss. Wm. L. Gates, secretary, Box 417, Clarksdale, Miss.

MISSOURI—June 4-5, 1958, Veterinary Clinic, University of Missouri, Columbia, Mo. Dr. L. A. Rosner, chairman, Missouri Veterinary Board, Box 630, Jefferson City, Mo.

MONTANA—June 30-July 2, 1958, Montana State College, Bozeman. J. W. Safford, secretary treasurer, Capitol Station, Helena, Mont.

NEW HAMPSHIRE—July 1, 1958, State House, Concord, N.H. J. P. Seraichick, secretary-treasurer.

NEW YORK—June 18, 19, 1958, practical examination, Ithaca; June 24-27, 1958, written examination, New York City, Albany, Syracuse, Buffalo, and Rochester. John W. Paige, chief, Bureau of Examinations and Registrations, 23 S. Pearl St., Albany, N.Y.

NORTH CAROLINA—June 23-25, 1958, Hotel Washington Duke, Durham, N. Car. James I. Cornwell, secretary, 65 Beverly Road, Beverly Hills, Asheville, N. Car.

OHIO—June 10-11, 1958, College of Veterinary Medicine, Ohio State University, Columbus. H. G. Geyer, DVM, secretary, Room 720, Ohio Department Building, 65 S. Front Street, Columbus 15, Ohio.

ONTARIO—June 9-11, 1958, Ontario Veterinary College, Guelph, Ont., G. A. Edge, secretary, Box 37, Postal Station F, Toronto 5, Ont.

RHODE ISLAND—July 8-9, 1958, 505 Veterans' Memorial Bldg., Providence, R.I. T. J. Grennan, Jr., secretary, Box 31, Allenton, R. I.

SASKATCHEWAN—June 17, 1958, University of Saskatchewan, Saskatoon, Sask. Fred M. Clark, secretary, 619 9th Ave., Saskatoon, Sask.

SOUTH CAROLINA—June 19-20, 1958 (tentative), Columbia. H. L. Sutherland, secretary, P. O. Box 87, Union, S. Car.

SOUTH DAKOTA—June 23-24, 1958, Veterinary South Dakota State College, Science Department, Brookings. Dr. M. D. Mitchell, secretary, Livestock Sanitary Board, Pierre, S. Dak.

TENNESSEE—June 23-24, 1958, Nashville, Tenn. W. O. Greene, secretary, 4119 Hillsboro Road, Nashville, Tenn.

UTAH—June 19-20, 1958, State Capitol Building, Salt Lake City, Utah. Obtain Application from Mr. Frank Lees, State Capitol Bldg., Salt Lake City. Dr. Wayne Binns, Chairman, Utah State Veterinary Board of Examiners, Utah State University, Logan, Utah.

VIRGINIA—June 26, 1958, Capitol Building, Richmond, Va. T. N. Burton, secretary, Department of Professional and Occupational Registration, P. O. Box 1-X, Richmond, Va.

WISCONSIN—June 23-24, 1958, Madison. A. A. Erdmann, State Capitol, Madison 2, Wis.

DEATHS

Star indicates member of AVMA

★**Leonard W. Goss** (OSU '05), 80, retired professor of veterinary pathology at Ohio State University, died on April 2, 1958, of a heart ailment in Winterhaven, Fla.

Born at Edinburg, Ohio, Dr. Goss received his

Dr. Leonard W. Goss

preliminary education in the local schools before enrolling in the College of Veterinary Medicine. He took postgraduate work at the University of Michigan and the University of Berlin. He began teaching in 1905 at Kansas State College where he was, successively, assistant in veterinary medicine, assistant professor, and then professor of veterinary pathology, a post he held from 1916 to 1919.

Dr. Goss was research pathologist for Parke, Davis & Co., in 1919-1920. He then returned to his alma mater where he was professor of veterinary pathology for 27 years prior to his retirement in 1947, when he was made professor emeritus. At that time, his colleagues estimated that he had helped train one tenth of the nation's veterinarians during his 42 years of teaching.

Dr. Goss was the owner of Gosswyre Kennels at Columbus and was active as a breeder of Irish Terriers for many years, also of Shetland ponies.

Surviving are his widow, the former Florence Joyce; a son, Dr. Leonard J. Goss, veterinarian (OSU'34) and assistant director of the Zoological Park, Bronx Park, N. Y., and two daughters.

• • •

Alvin B. Bingham (OSU '19), 64, Middleport, Ohio, died March 3, 1958. Dr. Bingham was a veteran of World War I. He had practiced in Meigs County for 40 years. His survivors include his widow, two daughters, a son, and four grandchildren.

Perry O. Bonham (IND '11), 67, Indianapolis, Ind., died March 17, 1958. Dr. Bonham had practiced at Mooresville and Indianapolis until his retirement ten years ago. He was nationally known for the horses he trained and showed, especially hunters and jumpers. He is survived by his widow, two sons, and two grandchildren.

Alvin H. Burris, 95, Woodridge, Conn., died March 7, 1958. Dr. Burris retired from practice in 1938. He is survived by a daughter, a step daughter, and one granddaughter.

Andrew E. Donovan (SF '02), 81, Cambridge, Mass., died March 3, 1958, at the Chelsea Naval Hospital, Chelsea, Mass., and was buried in Arlington National Cemetery. Dr. Donovan served as veterinarian with the Army from July, 1903, until June, 1916. He was then commissioned as first lieutenant in the Regular Army Veterinary Corps and attained the rank of colonel on July 29, 1929. He retired in September, 1934.

★**Thomas W. Healey** (CVC '06), 87, San Jose, Calif., died Feb. 11, 1958. Dr. Healey had practiced for 51 years prior to his retirement in June, 1957. He was admitted to the AVMA in 1907 and was granted live membership in 1956. He is survived by a sister.

★**Howard A. Janssen** (WSC '42), 38, Oakdale, Calif., died March 27, 1958. Dr. Janssen was active in professional and civic activities. He had served as president of the Northern San Joaquin Valley V.M.A., director of the Oakdale District Chamber of Commerce, as trustee for the Oakdale Elementary School District, and was active in Boy Scout work. He was admitted to the AVMA in 1942. Dr. Janssen is survived by his widow and four sons.

George R. H. Kauffman (UP '13), 67, Reading, Pa., died recently (date unknown). Dr. Kauffman had served with the Fairfield Dairy Co. in Hampden Heights. He had been a member of the AVMA.

William O. Ker (UP '42), 39, Philadelphia, Pa., died recently (date unknown). Dr. Ker had served in the Veterinary Corps, U. S. Army, and had been a member of the AVMA.

Claude E. Page (IND '42), 72, Carlisle, Ind., died in February, 1958. He had been in ill health for two years. Dr. Page is survived by his widow.

George B. Schuey (ONT '10), 72, Wilkinsburg, Pa., died recently (date unknown). Dr. Schuey was employed by the state government. He was a member of the Pennsylvania Veterinary Medical Association and had been a member of the AVMA.

★**Arthur C. Spivey** (IND '12), 79, Carmel, Ind., died March 17, 1958. Dr. Spivey started his practice in Carmel, Ind., then moved to Thorntown when he became superintendent of the Swine Breeders Pure Serum Co. He returned to Carmel after his retirement in 1956. Dr. Spivey was a member of the Indiana Veterinary Medical Association and had been a member of the AVMA. He is survived by his widow, two sons, three daughters, and nine grandchildren.

★**Dyar C. Wood** (KCV '18), 63, Greensburg, Ind., died March 27, 1958. Dr. Wood was a veteran of World War I and had practiced in 17 states. For a time, he served as technical adviser for the King Ranch in Texas. Since 1951, he was president of the Union Trust Co. in Greensburg; he had been a member of its board of directors for 30 years. Dr. Wood was a member of the Indiana V.M.A. and of the AVMA.

• • •

Other Deaths Reported.—The following deaths have been reported. The usual information for an obituary was not supplied.

Arthur C. Ammann (CVC '09), Decatur, Ill., died in October, 1955.

Frank A. Dolton (CVC '96), Mundelein, Ill., died Aug. 25, 1956.

John E. Kellberg (UP '35), Chicago, Ill., died in 1953.

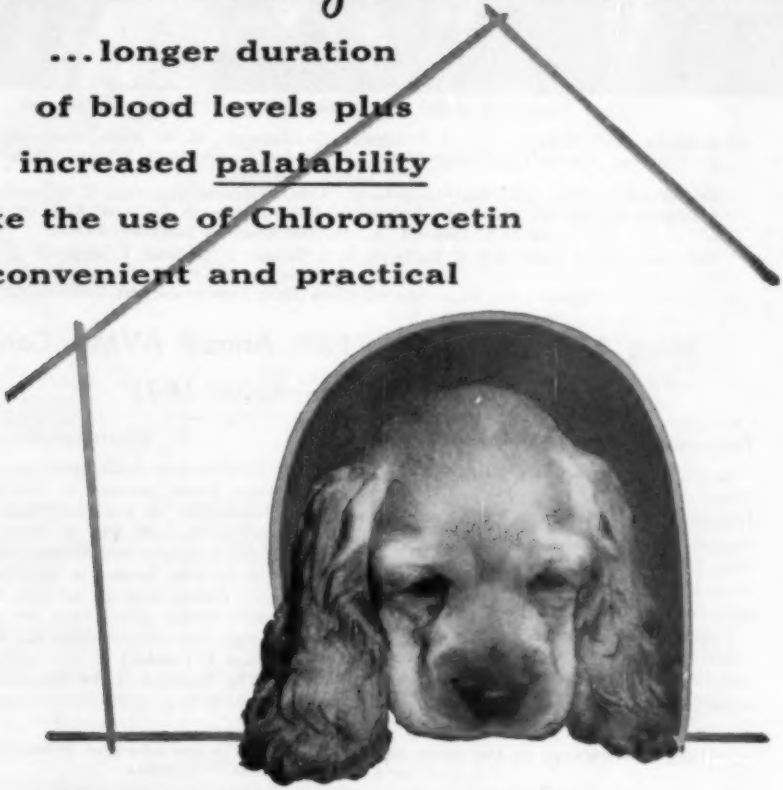
effective treatment of

kennel cough

with

SUSPENSION Chloromycetin® PALMITATE

...longer duration
of blood levels plus
increased palatability
make the use of Chloromycetin
convenient and practical



SUSPENSION CHLOROMYCETIN PALMITATE
WIDE ANTIBACTERIAL EFFECTIVENESS CHARACTERISTIC OF CHLOROMYCETIN

Suspension Chloromycetin Palmitate (suspension chloramphenicol Parke-Davis) is supplied in 60 cc. bottles, each 4 cc. (teaspoonful) representing 125 mg. of Chloromycetin.

PROFESSIONAL LITERATURE AVAILABLE ON REQUEST

Department of Veterinary Medicine
PARKE, DAVIS & COMPANY
Detroit 32, Michigan

Members of the Local Committee — Philadelphia Session

Front row (left to right)—Drs. S. F. Scheidy, Co-Chairman; M. W. Allam, Chairman; Mrs. Scheidy, Co-Chairman, Women's Activities; Mrs. R. C. Snyder, Co-Chairman, Women's Activities; Dr. R. C. Snyder, Secretary.

Second row (left to right) Drs. Hardenbergh, AVMA Executive Secretary; C. O. Neuhaus, Mrs. J. V. McCahon, Mrs. M. W. Allam, Mrs. T. E. Willis, Mrs. A. Bachrach, Dr. V. W. Ruth, Dr. R. A. Huebner, Dr. H. E. Kingman, Jr., Assistant Executive Secretary, AVMA.

Third row (left to right) Drs. A. Bachrach, A. S. Vansant, F. M. Iobst, T. McGrath, O. Stader, W. C. Glenney, C. W. Raker, Dr. J. E. Martin.

(Absent when the picture was taken: Dr. L. Krawitz and Mrs. D. Detweiler.)

More About the Ninety-Fifth Annual AVMA Convention

Philadelphia—August 18-21

Postconvention Tour to New York and Bermuda

Arrangements have been made with Happiness Tours of Chicago for group travel to Bermuda following the Philadelphia convention. These arrangements will feature choice of week-ends in New York City and a ten-day holiday in Bermuda. Tour leaflets giving detailed information and costs have been mailed to all AVMA members.

Optional sea/air travel is offered, also limited accommodations for a motor tour of New England for those who may not be interested in the New York-Bermuda tour holiday.

Hotels and Housing

Information about rates and reservations in the seven hotels selected to house conventioners in Philadelphia is published again in this issue. A reservation form will be found on adv. page 45 facing a location map on adv. page 44.

A housing bureau is handling reservations and early registrations are advised. All the hotels listed offer "family plan" rates for children (no extra charge for accommodations for children 14 years of age and under).

The Sheraton is the headquarters hotel. All the hotels have air-conditioned rooms.

Longwood Gardens, on the estate of Pierre S. du Pont in the suburb of Wilmington, is favorably compared with the gardens at Versailles.

in a variety of eczematous and infectious skin disorders

Vioform®-Hydrocortisone CREAM

Whether your animal patients are large or small: you'll want to treat skin disorders by reducing inflammatory reactions and controlling associated microbial infection. Note these points in favor of Vioform-Hydrocortisone Cream, combination therapy for comprehensive, complementary action:

Broader Control	Better Over-all Results
Anti-inflammatory	Hydrocortisone relieves discomfort due to inflammation; reduces edema; controls scaling.
Antipruritic	Hydrocortisone also relieves painful, itching skin; wards off danger of self-mutilation.
Antibacterial	Vioform checks secondary pathogens invading traumatized and eczematous skin tissues.
Fungicidal	Ringworm and other fungal infections are rapidly cleared by the fungicidal action of Vioform.
Low Toxicity	*Cats with ringworm infection can be given frequent applications of Vioform-Hydrocortisone.*

For effective treatment: (1) Clip area to be treated. (2) Apply Vioform-Hydrocortisone Cream sparingly 3 to 4 times a day, working it well into the affected regions. Continue applications for 3 to 4 days to obtain desired anti-inflammatory effect of hydrocortisone. (3) Then continue therapy with Vioform Cream alone.

Indications: Eczematous dermatoses and associated bacterial and fungal invaders. Ringworm and other primary fungal infections. Infected anal glands and interdigital dermatitis accompanied by surgical drainage of the cysts.

Supplied: *Vioform-Hydrocortisone Cream,* containing iodochlorhydroxyquin 3% and hydrocortisone 1% in a water-washable base; tubes of 5 and 20 Gm. *Vioform Cream,* containing iodochlorhydroxyquin 3% in a water-washable base; tubes of 1 ounce and jars of 1 pound.

VIOFORM® (iodochlorhydroxyquin CIBA)

C I B A Summit, New Jersey

z/2461 VH

You design it... we print it!

A unique service

Your own personally designed case history forms at just about stock form prices.

You design your form in rough pencil sketch — we refine it to a finished product.

Only we, the makers of famous "Histacount" products, have the know how and organization to render this service at such low prices.

WRITE FOR DETAILS

PROFESSIONAL
PRINTING COMPANY, INC.
50 HISTACOUNT BUILDING
NEW HYDE PARK, N. Y.

PROFESSIONAL
PRINTING COMPANY, INC.

- AMERICA'S LARGEST PRINTERS TO THE PROFESSIONS
- SERVING THE DOCTORS OF AMERICA FOR OVER A QUARTER OF A CENTURY
- THE HOME OF "HISTACOUNT" PRODUCTS
- EVERYTHING FOR YOUR OFFICE WITHOUT LEAVING YOUR DESK
- WHERE LIFE LONG CUSTOMERS BUY WITH CONFIDENCE
- YOUR SATISFACTION UNCONDITIONALLY GUARANTEED

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (e) of Section 2, Article X, of the Administrative Bylaws, the names of applicants residing within the jurisdictional limits of a constituent association shall be published once in the JOURNAL.

The following applicants have been certified by the secretary of the applicable constituent association in accordance with paragraph (c) Section 2, Article X, of the Administrative Bylaws.

CRAVENS, M. L.
9154 Rathbone, Detroit, Mich.
D.V.M., Iowa State College, 1920.

DAMBERGS, JAKABS N.
36 Lebanon Ave., Willimantic, Conn.
D.V.M., University of Latvia, 1939.

DAVIS, CHARLES W.
5120 Holmes Road, Houston, Texas
D.V.M., University of Houston, 1953.

IBSEN, DAVID
4312 Lochridge, North Little Rock, Ark.
V.M.D., University of Pennsylvania, 1943.

MARTIN, JAMES F.
Box 392, Watertown, Conn.
D.V.M., New York State Veterinary College, 1951.

POWELL, WILLIAM D.
101 Stampede, Newcastle, Wyo.
D.V.M., University of Illinois, 1957.

STREETER, CHARLES E.
Mohawk Trail, Shelburne Falls, Mass.
D.V.M., Ohio State University, 1932.

Applicants—Not Members of Constituent Associations

In accordance with paragraph (e) of Section 2, Article X, of the Administrative Bylaws, the names of applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months.

The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

GRAU, WILLIAM H., Jr.
M.O.A., 207A, Gunter Air Force Base, Ala.
V.M.D., University of Pennsylvania, 1948.
Vouchers: Erby L. Massie and John S. Zwiers.

McCLAIN, JACK
43rd Med. Det. (VFI), APO 58, New York, N. Y.
D.V.M., Michigan State College, 1945.
Vouchers: Curtis W. Betzold and William E. Jennings.

Second Listing

ADAMS, EUGENE WILLIAM,
P. O. Box 267, Tuskegee Institute, Ala.

BAJWA, GURWANT S.,
210 Cedar St., East Lansing, Mich.

EISCHEN, JOHN NICHOLAS,
1st Hospital Unit, 45th Field Hospital, APO 19, New York, N. Y.

MILLER, EVERETT B.,
Poortlaan 2, Wassenaar, Netherlands.

Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative Bylaws to members in good standing of student chapters.

First Listing

Ontario Veterinary College

All of the following applicants were vouched for by Drs. T. L. Jones and J. A. Henderson.

ASSELSTINE, EDWARD N., D.V.M.
221-29 Ave., N. E., Calgary, Alta.

BAER, HAROLD, D.V.M.
7955 Mulberry St., Montreal, Que.

BARTOLF, FREDERICK, D.V.M.
Estevan, Sask.

BEAUREGARD, SALLY T., D.V.M.
779 St. Clair Ave. W., Toronto, Ont.

BILISKI, PETER, D.V.M.
Department of Agriculture, Toronto, Ont.

BILLIN, CAROLE A., D.V.M.
286 Pleasant St., Concord, N. H.

BILLIN, ROBERT B., D.V.M.
286 Pleasant St., Concord, N. H.

BODENDISTEL, JAMES K., D.V.M.
Upper James St., Hamilton, Ont.

CALVERLEY, JOHN L., D.V.M.
R. R. 1, Cache Bay, Ont.

DAVIES, RODERICK R., D.V.M.
183 Eglington Ave. W., Toronto, Ont.

DONALD, LEIGH B., D.V.M.
Sackville, N. B.

EASTON, KENNETH L., D.V.M.
30757 Greenfield Rd., Royal Oak, Mich.

EROS, JULIA, D.V.M.
62 Heathdale Rd., Toronto, Ont.

FINLAY, RONALD C., D.V.M.
Box 58, Erin, Ont.

FISHER, LLOYD D., D.V.M.
6 Sophia St., Barrie, Ont.

GRAY, DONALD P., D.V.M.
Mountain, Ont.

GREENAWAY, LORNE E., D.V.M.
1168 Battle St., Kamloops, B. C.

HILLS, DONALD K., D.V.M.
356 Ominica St. E., Moose Jaw, Sask.

LANTINK, CHRISTIAN J., D.V.M.
Kincardine, Ont.

McDONALD, JAMES A., D.V.M.
2901 Lafayette Rd., Indianapolis, Ind.

McKAY, KENNETH A., D.V.M.
5 Dormie Lane, Guelph, Ont.

McKEOWN, DONAL B., D.V.M.
4615 - 41st St., Washington, D. C.

MARLING, KEITH E., D.V.M.
Creston, B. C.

MILLER, DOUGLAS S., D.V.M.
390 St. David St. S., Fergus, Ont.

O'CONNOR, A. TERENCE, D.V.M.
400 Pembina Highway, Winnipeg, Man.

PENNOCK, PAUL W., Jr., D.V.M.
Ontario Veterinary College, Guelph, Ont.

RHOADS, CHARLES F., D.V.M.
R. 3, Woodslee, Ont.

SCHAEFFER, WILLIAM D., D.V.M.
Kirkton, Ont.

SCHOOLEY, MERYL P., D.V.M.
Ilderton, Ont.

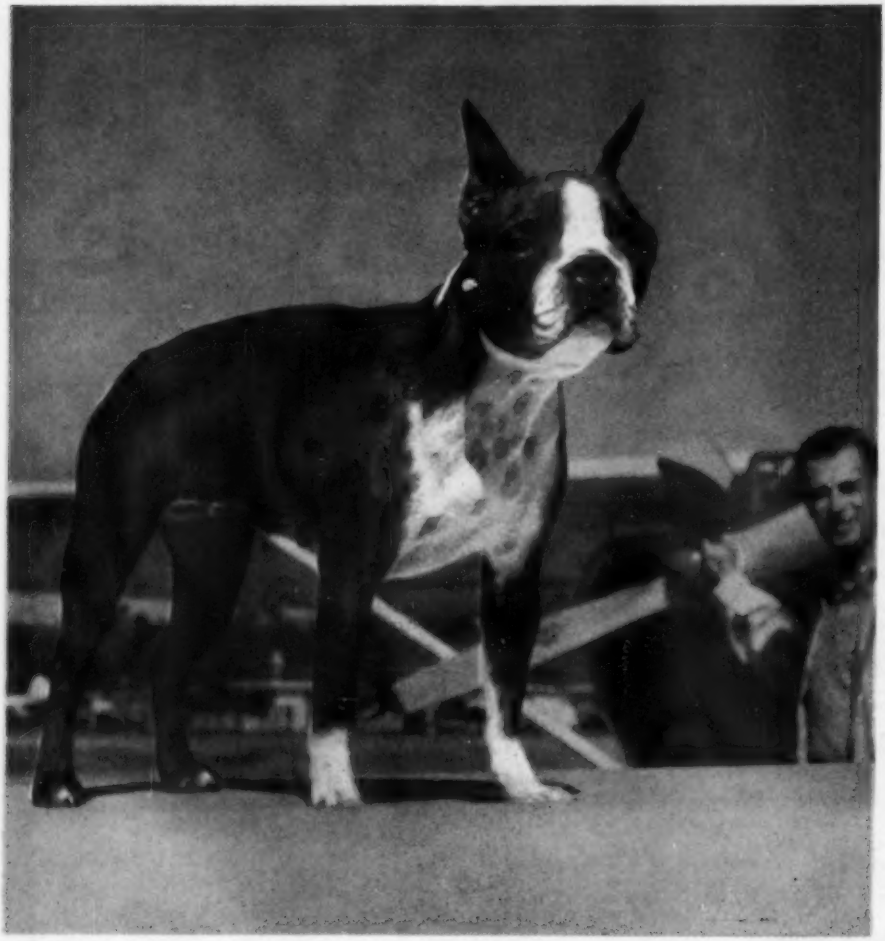
SMITH, HARRY J., D.V.M.
Box 293, Ontario Veterinary College, Guelph, Ont.

Van der MEULEN, ALBERT C., D.V.M.
2000 Grove Ave., Highland Park, Detroit, Mich.

WIDDUP, CLIFFORD R., D.V.M.
Ontario Veterinary College, Guelph, Ont.

THE KEN-L-BISKIT DOG:

healthier... handsomer... stands out from the rest



Costs only PENNIES A DAY to feed him the Dog Food of Champions

Ken-L-Biskit . . . so nutritious, it's the official food at more A.K.C. shows than all other dog foods combined. So dependable, America's top kennels have used it to develop generation after generation of champions. So digestible, even puppies thrive on it. Complete . . . needs no expensive supplements. Get it today, in the thrifty fifty-pound bag.

COMING MEETINGS

Michigan Veterinary Medical Association. Annual meeting. Grand Hotel, Mackinaw Island, June 2-4, 1958. Charles Coy, Hillsdale, general chairman.

Texas A. & M. College. Eleventh annual Texas conference for veterinarians. School of Veterinary Medicine, Texas A. & M. College, College Station, June 5-6, 1958. R. D. Turk, chairman.

Kansas State College. Annual conference for veterinarians. School of Veterinary Medicine, Kansas State College, Manhattan, June 5-7, 1958. E. E. Leasure, dean.

Montana Veterinary Medical Association. Summer meeting. Florence Hotel, Missoula, June 16-18, 1958. G. A. Morrison, 316 Central Ave., Great Falls, secretary.

Georgia-South Carolina Veterinary Medical Association. Joint Meeting, Bon Air Hotel, Augusta, Ga., June 19-21 1958. A.M. Mills, 325 Pinecrest Drive, Athens, Ga., secretary, program committee.

Idaho and Wyoming Veterinary Medical Association. Joint meeting. Wort Hotel, Jackson Hole, Wyo., June 21-23, 1958. A. P. Schneider, 3025 N. 23rd St., Boise, Idaho, IVMA secretary; J. F. Ryff, P.O. Box 960, Laramie, Wyo., WVMA secretary.

California Veterinary Medical Association. Seventieth annual meeting. Hotel St. Claire, San Jose, June 23-25, 1958. C. H. Ozanian, 10326 Artesia Blvd., Bellflower, program chairman; Chas. S. Travers, 3004 16th St., San Francisco, executive secretary.

Maritime Veterinary Associations. Joint conference. Mount Allison University, Sackville, N.B., June 24-26, 1958. Dr. J. F. Frank, Box 310, Sackville, N.B., chairman.

North Carolina State Veterinary Medical Association. Fifty-seventh annual meeting. The Washington Duke Hotel, Durham, June 24-26, 1958. C. J. Lange, 3741 Hi-Point Rd., Greenboro, secretary-treasurer.

Utah Veterinary Medical Association. Annual meeting. Ogden, June 25-26, 1958. J. A. Thomas, P.O. Box 592, Provo, secretary.

Nebraska State Veterinary Medical Association. Summer meeting. Kearney, Neb., July 18-20, 1958. W. T. Spencer, 1250 N. 37th, Lincoln, secretary.

Alabama Polytechnic Institute. Annual conference for veterinarians. School of Veterinary Medicine, Auburn, July 20-23, 1958. T. C. Fitzgerald, program chairman.

Kentucky Veterinary Medical Association. Forty-seventh annual convention. Seelbach Hotel, Louisville, July 21-22, 1958. R. H. Singer, 136 Shawnee Place, Lexington, secretary-treasurer.

Canadian Veterinary Medical Association. Tenth annual Convention. Royal Alexandra Hotel, Winnipeg, Manitoba. July 21-23, 1958. Claude Kenley, 1195 Wellington St., Ottawa 3, Ont., executive secretary.

Mississippi State Veterinary Medical Association. Fifty-second annual meeting. Buena Vista Hotel, Biloxi, Aug. 10-12, 1958. H. F. McCrory, State College, Miss., secretary.

American Association of Veterinary Bacteriologists. Annual meeting. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Aug. 16, 1958. C. H. Cunningham, Michigan State University, College of Veterinary Medicine, East Lansing, secretary.

American Veterinary Medical Association. Ninety-Fifth Annual Meeting. Convention Hall, Philadelphia, Pa., Aug.

OZIUM®

the Glycol-ized **AIR FRESHENER**

SPRAYS AWAY OFFENSIVE ODORS

Instantly

As recommended and Used in Hundreds of Hospitals Across the Nation

Visitors to your Reception Rooms, Offices and Operating Rooms will appreciate the pleasing atmosphere created by "Ozium-freshened air." OZIUM scientifically eliminates unwanted odors and smoke without leaving after odors.

No. 500 "Personal Size" OZIUM Dispenser is easy and unobtrusive to use, fits conveniently in pocket or cabinet drawer.

CALL YOUR DISTRIBUTOR TODAY FOR A SUPPLY OF OZIUM

NEW *No. 500 Patented Meter Valve Assures 500 Individual* Measured *Sprays.*

For larger areas, use No. 3000 OZIUM Dispenser for 3,000 or more "King Size" Individual Measured *Sprays.*

Manufactured by **WOODLETS INC.**
2048 Niagara St., Buffalo 7, New York

18-21, 1958. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

New York State Veterinary Medical Society. Sixty-seventh annual meeting. Concord Hotel, Kiamesha Lake, N. Y., Sept. 4-6, 1958. Miss Joan S. Halat, 803 Varick St., Utica, N. Y., executive secretary.

Washington State Veterinary Medical Association. Annual meeting. Olympia, Sept. 8-9, 1958. Fred M. Shigley, program chairman. Robert M. Ford, 2406 Boyer Ave., Seattle, executive secretary.

South Dakota Veterinary Association. Meeting. Hotel Cateract, Sioux Falls, Sept. 16-17, 1958. G. E. Duncan, Tyndall, secretary.

New England Veterinary Medical Association. Annual meeting. Hotel Wentworth, Portsmouth, N. H., Sept. 28-Oct. 1, 1958. C. Lawrence Blakely, 100 Longwood Ave., Boston 15, Mass., secretary-treasurer.

District of Columbia Veterinary Medical Association. Annual all-day meeting. Walter Reed Army Medical Center, Washington, D.C., Oct. 14, 1958. W. I. Gay, 5200 Chandler St., Bethesda, Md., secretary-treasurer.

Eastern Iowa Veterinary Association. Forty-fifth annual meeting. Hotel Roosevelt, Cedar Rapids, Iowa. Oct. 16-17, 1958. F. E. Brutsman, Traer, Iowa, secretary.

Texas Veterinary Medical Association. Annual meeting. Stephen F. Austin Hotel, Austin, Oct. 19-21, 1958. Paul B. Blunt, 710 Maverick Bldg., San Antonio, secretary.

Florida State Veterinary Medical Association. Annual meeting. Galt Ocean Mile Hotel, Fort Lauderdale, Oct. 26-28, 1958. A. R. Chambers, 6116 Main St., Jacksonville, secretary.

Southern Veterinary Medical Association. Annual meeting. Claridge Hotel, Memphis, Tenn., Oct. 26-30, 1958. A. A. Husman, P.O. Box 91, Raleigh, N. Car., secretary.

Arizona Veterinary Medical Association. Annual meeting. Yuma, Ariz., Dec. 7-9, 1958. R. E. McComb, Jr., 4730 N. 7th Ave., Phoenix, program chairman.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Jan. 11-13, 1959. H. W. Hayes, 5009 Clinton Pike, Knoxville, secretary-treasurer.

Oklahoma Veterinary Medical Association. Annual meeting. Mayo Hotel, Tulsa, Jan. 25-27, 1959. M. N. Riemenschneider, 122 State Capitol Bldg., Oklahoma City, secretary.

Foreign Meetings

Sixth International Congresses on Tropical Medicine and Malaria. Lisbon, Portugal, Sept. 5-13, 1958. Professor Manuel R. Pinto, Institute of Tropical Medicine, Lisbon, secretary-general. (Membership application forms may be obtained by U.S. veterinarians by writing to the AVMA.)

German Veterinary Association. Regular biennial meeting. Hannover, Germany, Sept. 19-21, 1958. Dr. Karl Ohly, 123 Forsthausstrasse, Frankfurt/Main, Germany, president.

International Veterinary Congress. Sixteenth session. Madrid, Spain, May 21-27, 1959. Prof. Pedro Carda A., general secretary, Calle Villanueva 11, Madrid.

SUN-RAY

The "BIG 3" SERIES of CLIPPER BLADE GRINDERS

will save you time and money too!

Sun Ray's scientifically designed and engineered grinders assure you of correctly ground blades to professional sharpness every time.

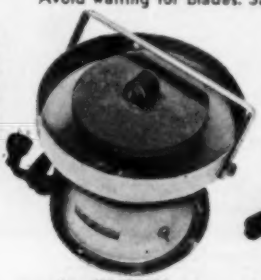
Easy to Use. No previous experience or special skill necessary. Just remove blades from clipper . . . place on grinder — THAT'S ALL! Avoid waiting for blades. Save on periodic grinding costs.

the ROYAL

A complete grinding ensemble . . . the ultimate in versatility — HONES, GRINDS, SHARPENS & POLISHES (note protective guard & adjustable grinding rail)

Royal 6—6" Metal Disc & Stone Wheel

Royal 7—7" Metal Disc & Stone Wheel



the IMPERIAL

Fast grinding stone wheel that guarantees super sharp blades every time (note protective guard ring and adjustable grinding rail)

Imperial 6-6" Stone wheel

Imperial 7-7" Stone wheel

Imperial 8-8" Stone wheel

the REGULAR

The economy model for excellent honing and polishing results

Model A-6" Metal Disc

Model C-7" Metal Disc

Model B-9" Metal Disc

NEW Patent BLADE HOLDER with every Sun Ray grinder

Simplifies grinding — saves wear — prevents abrasions

For FREE literature & information ask your dealer, or write

SUN RAY HAIR PREPARATIONS CO.

2404 Fuller St., New York 61, N. Y.

new specific treatment for calf scours

Developed specifically for the control of calf scours, new ENTEFUR provides rapid, effective and safe treatment. ENTEFUR drastically cuts mortality.[1,2] In one study, 60 of 63 ENTEFUR-treated calves survived, whereas in the control group only 3 of 24 calves lived.[2] "ENTEFUR treatment appeared the only factor modifying significantly the course and outcome of the disease."[2]

ENTEFUR contains the new nitrofuran, Furamazone® (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

ENTEFUR BOLUS VETERINARY, small, contains: Furamazone 1 Gm., bismuth subsalicylate 0.26 Gm. Dosage: 1 bolus twice a day for 2 days. Supplied: Box of 24 (6 envelopes of 4 boluses each).

REFERENCES. 1. Bull, W. S.: N. Amer. Vet., in press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., in press.

ENTEFUR™

NOW AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

EATON LABORATORIES, NORWICH, NEW YORK

PARLAMATE®

(piperazine citrate, PARLAM)

The Safest, Most Effective Wormer

Now available at the lowest prices in the field

'PARLAMATE' is a safe, new all species anthelmintic. Taste tested! Up to 100% effective against roundworms and nodular worms, in only one treatment. Highly acceptable. Pleasant tasting. Completely odorless.

For Dogs, Large Animal and Poultry Use:

#683, 'PARLAMATE' Citrate Liquid 30%. (Each fl. oz., approximately 30cc., contains 9 Gms. piperazine citrate, which is equivalent to 3.6 Gms. active anhydrous piperazine base.)

Gallon bottle	$9.60
Quart bottle	2.95
Pint bottle	1.65
8 fl. oz. bottle	.92
4 fl. oz. bottle	.54

#684, 'PARLAMATE' Citrate Tablets, 500 mg. (Each tablet contains the equivalent of 200 mg. available piperazine.)

Bottle of 1,000	$20.00
Bottle of 500	10.67
Bottle of 100	2.67

#680, 'PARLAMATE' Citrate Powder. (Contains 100% piperazine citrate.) In pre-weighed dispensing packages convenient for office and field use.

100 lb. bulk, per lb.	$4.73
50 lb. bulk, per lb.	4.80
25 lb. bulk, per lb.	4.87
10 lb. bulk, per lb.	4.93
5 lb. bulk, per lb.	4.97
16 oz. bottle	$5.00
8 oz. bottle	3.00
4 oz. bottle	1.67
1 oz. bottle	.50

For Puppies, Cats and other Small Animal Use:

#681, 'PARLAMATE' Citrate Tablets, 250 mg. (Each tablet contains the equivalent of 100 mg. available piperazine.)

Bottle of 1,000	$10.00
Bottle of 500	5.34
Bottle of 100	1.34

#682, 'PARLAMATE' Citrate Liquid 5%. (Each teaspoonful, approximately 5 cc., supplies 250 mg. piperazine citrate, which is equivalent to 100 mg. available piperazine.)

Gallon bottle	$8.00
Quart bottle	2.40
Pint bottle	1.34

Additional discounts as follows:
Orders totaling $100 or more.....less 5%
TERMS 1/10 NET 30, F.O.B. New York City
Freight allowed on orders of $25.00 or more.

You may order direct, or we can drop ship and bill you through your distributor.

Literature and samples on request.

TARGET POINT CHEMOTHERAPY

Parlam CORPORATION ● 266 S. Dean Street, Englewood, N.J.

SOLE CANADIAN DISTRIBUTOR: Veterinary Medical Supply Co. of Canada, 6579 Somerled Ave., Montreal, Que.

"Pioneer in veterinary medicine for target point chemotherapy"

U.S. COMMITTEE: Dr. W. A. Hagan, chairman, New York State Veterinary College, Ithaca, N. Y.; Dr. J. G. Hardenbergh, secretary, 600 S. Michigan Ave., Chicago 5, Ill.

Third World Congress on Fertility and Sterility. Amsterdam, Holland, June 7-13, 1959. Dr. L. I. Swaab, Sint Agnietenstraat 4, Amsterdam, Holland, honorary secretary.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. Dr. G. W. Jones, Main St., Prattville, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, Decatur, Ala., secretary.

North East Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2 Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16 St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. A. L. Irwin, 301 Taft Highway, Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643-N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. R. M. Granfield, 2600 W. El Camino Real, San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert L. Chandler, P.O. Box 8, Ukiah, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Dr. V. H. Austin, 14931 Oxnard St., Van Nuys, secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. Dr. Rolf Reese, 23815 Ventura Blvd., Calabasas, Calif., secretary.

Santa Clara Valley Veterinary Association, the fourth Tuesday of each month. Kay Beulley, N. Fourth and Gish Rd., San Jose, Calif., secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month. D. E. Britten, 544 N. Ben Maddox, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

M·A·C

Quick relief for Bone, Bursal or Tendon Lameness

Single Bottle.....$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

Dr. Iain Paton Joins Jensen-Salsbery

Dr. Iain Paton of Scotland has joined the staff of Jensen-Salsbery Laboratories as research veterinarian. A native of Scotland, Dr. Paton, after obtaining his D.V.M. degree from the University of Glasgow, practiced for ten years. He is a specialist in intestinal parasites.

Serological Tests and Animal Relationships.—With a number of different blood serum tests, it was shown that the cat was more closely related to the cheetah (76% relationship) than to the tiger (50%). Black bear antiserum gave a higher cross-reaction with sea lion antigen than with raccoon, red fox, and skunk antigens.—[*Sci. News Letter (Feb. 22, 1958): 118.*

58-3

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Central Florida Veterinary Medical Association, the first Tuesday of each month, time and place specified monthly. Jack H. McElyer, 5925 Edgewater Drive, Orlando, Fla., secretary.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. William F. Casler, 2540 30th Ave., N., St. Petersburg, secretary-treasurer.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodsons Restaurant. P. S. Roy, 4443 Atlantic Blvd., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. T. R. Geci, 108B Catherine Ave., Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. J. J. McCarthy, 500-25th Street, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Frank Mueller, Jr., 4148 E. 8th Ave., Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. W. B. Martin, Jr., 3002 N. W. 6th St., Gainesville, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Donald C. Ford, Forest Park, secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. Alfred G. Schiller, Veterinary Clinic, University of Illinois, Urbana, secretary-treasurer.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P. O. Box 52, Pendleton, Ind., secretary.

(*Continued on adv. p.* 39)

Dr. M. A. Schooley Appointed to New Position on Staff of Armour and Company

The appointment of Dr. M. A. Schooley (KSC '38) to the new position of director of Animal Health and Nutrition Applied Research has been announced by Armour and Company. Dr. Schooley has been with Armour since 1951 in the field of veterinary pharmaceutical research.

MICROBIAL SENSITIVITY TEST KIT—Complete unit provides inexpensive, fast and accurate way to determine best antibiotic to treat infections. Kit includes test ring impregnated with 10 antibiotics; disposable blood agar plate with enriched nutrient; sterile swab; sample-collecting vial.

CALIFORNIA MASTITIS TEST—Simple method for estimating cell content of milk. Use as screening test for composite herd samples, for individual cows or individual quarters.

NITRITE-NITRATE TEST TABLETS—Rapid field test for diagnosing nitrite or nitrate poisoning. Use on dry or green feedstuffs.

FECAL COUNTING CHAMBER KIT—Quick McMasters method of counting parasite eggs per gram of feces.

Another personal service for you from HAVER-LOCKHART LABORATORIES

38-3

proven results in these diseases of small animals

CANINE TRACHEOBRONCHITIS (KENNEL COUGH). In one study of 12 cases, FURADANTIN stopped the cough completely within 3 to 7 days.[1]

URINARY TRACT INFECTIONS. Extensively used in human genitourinary tract infections, FURADANTIN has also produced impressive clinical results in the treatment of bacterial nephritis and cystitis of dogs and cats.[2]

• • •

Preliminary data point to new indications for FURADANTIN. Various reports describe encouraging results with FURADANTIN in the treatment of vaginitis in the bitch and genitourinary tract infections of mares.[2] Another article concludes that FURADANTIN is an excellent adjunct to surgery in the treatment of prostatic abscess in the dog.[3]

Like all the nitrofurans, FURADANTIN is bactericidal to a wide range of both gram-negative and gram-positive organisms. It is nontoxic to kidneys, liver and blood-forming organs; and development of bacterial resistance is negligible.

Available as orange scored tablets of 10, 50 and 100 mg.; and Oral Suspension, bottle of 60 cc.

REFERENCES: 1. Mosier, J. E.: Vet. M. 50:605 (Nov.) 1955. 2. Belleff, O. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Pollock, S.: J. Am. Vet. M. Ass. 129:274 (Sept.) 1956.

FURADANTIN®
BRAND OF NITROFURANTOIN
veterinary

AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

NITROFURANS—A NEW CLASS OF ANTIMICROBIALS—NEITHER ANTIBIOTICS NOR SULFONAMIDES... PRODUCTS OF [illegible]

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below—then turn the page ▸

Figure 1

History.—A female Bull Mastiff, 4 years old, developed lameness in the right foreleg, starting in October, 1956. Enlargement of the upper humeral region was noticed about mid-January, and the above radiograph (fig. 1) was taken on Feb. 27, 1957. At that time the mass was hard and not particularly sensitive.

Here Is the Diagnosis

(*Continued from preceding page*)

Diagnosis.—Osteogenic sarcoma of the humerus.

Comment.—Dogs of the giant breeds have a predilection to osteogenic sarcoma, especially in the ends of long bones. Starting with these probabilities, one can add that this lesion developed slowly, causing little disturbance except for the lameness and, more recently, the enlargement. The radiograph shows characteristic features of osteogenic sarcoma; the bone spicules radiate from the center (in so-called "rising sun" fashion).

The lesion is proliferative, showing growth into the soft tissue which denotes a high degree of malignancy. It has not crossed the joint but there is growth beneath the periosteum distally, causing "abutment" formation.

The destruction occurring in the tumor is only slightly evident in this radiograph (fig. 1), probably because the large amount of proliferative bone tissue obscures the decalcification which is present in the center of the tumor.

This case was submitted by the staff of the Angell Memorial Animal Hospital, Boston, Mass.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Newer Pleasure-Type Horses

The Tennessee Walking Horse was first recognized and registered in 1935. It originated from mares with Narragansett pacing blood crossed with Morgan and Thoroughbred stallions. Many are large enough to work in the fields yet agile enough to ride. They have stamina, a gentle disposition, and an easy gait. Their three natural gaits are: the flat-foot walk, running walk, and canter. Their distinctive gait is the running walk which is usually accompanied by rhythmical nodding, and swinging of the ears; some also snap their teeth. This is a two-beat gait which gives the rider a smooth, gliding sensation at 5 to 8 miles an hour. These horses stand 15 to 16 hands high, weigh 1,000 to 1,250 lb., and are of any color—often with white patches, stockings, or bald faces.

The Palomino, or golden horse, was first registered in 1936. The only required characteristic is the gold color which may be of various shades, but preferably that of "newly minted gold coin." White, black, or smudge spots are not acceptable. The manes and tails must be white, silver, or ivory with not more than 15 per cent dark or chestnut hairs present. They must be 14 hands high, with one parent registered as a Palomino, Thoroughbred, Standardbred, Arabian, Morgan, American Saddle Horse, or Tennessee Walking Horse; neither parent can be albino, piebald, pony, or draft horse.

The Quarter Horse, which has been recognized since 1940, was developed by selection for speed at short distances, remarkable maneuverability, and great strength. They have a short back, strong loin, wide chest, powerful forearms and gaskins, and short cannons, with the limbs set well under a deep body. They have an easy gait, in which the feet swing low, and a characteristic gallop.

Shetlands are of two types: the draft type which is the original blocky animal, and the American or road type, developed from pure Shetland stock.—*C. Westerfield in Vet. Scope, Univ. of Missouri (Fall, 1957): 6.*

now for both large and small animals

dramatic relief

for musculoskeletal disorders

BUTAZOLIDIN®

brand of phenylbutazone*

(VETERINARY)

Butazolidin brings to veterinary practice the first economical **non-hormone** approach to relief of inflammation, pain, swelling and fever resulting from posterior paralysis (vertebral disc syndrome) and a wide range of common lamenesses. Continuous reports of successful use of Butazolidin in intractable lamenesses of animals indicate its combined anti-inflammatory, anti-arthritic, antipyretic and analgesic effect to be without precedent among veterinary drugs.

Butazolidin acts quickly, often within a few hours of administration. Treated animals rest comfortably, rehabilitate themselves. Painful handling of stricken animals is minimized by convenient tablet dosage. Used as directed, Butazolidin may be administered without danger of drug toxicity, metabolic upset or glandular atrophy.

Butazolidin is supplied in jars of 100-100 mg. tablets for small animals, 50-1 Gm. tablets for large animals. If you have not yet had the opportunity to see Butazolidin's dramatic results in your practice, order a supply today.

Jen-Sal

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

*U. S. Pat. No. 2,562,830
Under license from Geigy Chemical Corporation

FROMM

cut your distemper losses with...

FROMM

distemperoid virus

ferret origin • viablized

prophylactically efficient
therapeutically effective

sold to graduate veterinarians only • contact your local distributor

"LIFE WITH ROVER". How is your supply of this little booklet that tells about the ancestry, diet and health-care of dogs? Whenever you want more copies, ask your local distributor.

FROMM
Laboratories, Inc.
Grafton, Wisconsin, U.S.A.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month, except June, July, and August, at 6:30 p.m., Breeze House, Ankeny, Iowa. John Herrick, Ames, secretary.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Association, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. Dr. J. G. Irwin, Iowa City, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Winneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer, Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. Richard Baum, Osage, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Versailles Rd., Frankford, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. W. E. Bewley, P.O. Box "H," Crestwood, secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Norman Herbert, 3506 Joann Drive, Baltimore 7, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Chester R. Pleggé, 4249 Peck St., St. Louis 7, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Frank A. O'Donnell, Parksville, Mo., secretary-treasurer.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. Burrit Lupton, 569 Franklin Ave., Wyckoff, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. R. Muller, 43 Church St., Lambertville, N. J., secretary.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. R. M. Sauer, secretary.

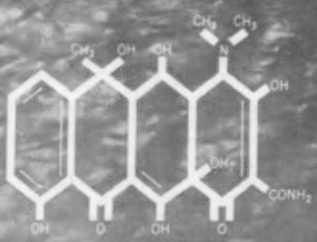
NEW MEXICO—Bernalillo County Veterinary Practitioners Association, third Wednesday of each month, Fez Club,

BROKEN TEETH
—repaired in bottom clipper blades. Top and bottom blades sharpened to match. Save money—Guaranteed. Prices on Request
HIGHLY SPECIALIZED SHARPENING
Sales—Repairing on Oster and Steuart clippers.
Sharpened Blades Tested on Rabbit Fur
Prompt Service—Est. 17 years
CLIPPER SERVICE
Oak Ridge, N. J.

New—for instantaneous use

LIQUAMYCIN*

OXYTETRACYCLINE SOLUTION



a sparkling-clear solution of the broad-spectrum antibiotic, oxytetracycline

The diversified conditions under which veterinary medicine is practiced call for a broad-spectrum antibiotic designed for rapid systemic effect and offering the maximum in convenience, economy and versatility.

A 480 cc. LIQUAMYCIN bottle contains 12 grams of oxytetracycline in solution. Each cc. contains 25 mg. of oxytetracycline.

Convenient—A sparkling-clear, stable solution for easy, instantaneous use.

Economical—A rapid, therapeutic, systemic dose at minimum cost.

Versatile—Oxytetracycline has an unsurpassed 8-year record of clinical success in a wide variety of infectious diseases.

*Trademark

Sold exclusively to veterinarians.

Pfizer

Department of Veterinary Medicine
PFIZER LABORATORIES, Brooklyn 6, N. Y.
Division, Chas. Pfizer & Co., Inc.

Albuquerque, N.M., Jack Ambrose, 3018 N. Rio Grande Blvd., Albuquerque, secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

New York State Veterinary College, Annual conference for veterinarians. Cornell University, Ithaca. W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N. Y., dean.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. Joseph A. Lombardo, 411 Woodlawn Ave., Greensboro, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly, Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. T. L. James, Box 243, Newton, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Ashville, N. Car. Vilu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April, and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. D. J. Kern, Killbuck, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the third Tuesday of each month, at 9:00 p. m., Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the

Split Channel Conversion Kits Available from Motorola

Simple, low cost conversion kits will adapt any Motorola mobile two-way radiophone sold since 1949 to full split channel operation, according to the company.

Motorola, since 1949, has anticipated eventual split channel requirements and has designed its equipment accordingly.

The FCC currently requires that certain newly licensed systems meet split channel standards as of April 1, 1958. All other newly licensed systems must comply by Nov. 1, 1958, and all systems, whenever licensed, must meet standards by Nov. 1, 1963.

Estimated conversion time for an average technician is a maximum of 20 minutes for any Motorola mobile or base station model with a minimum of test equipment and shop facilities.

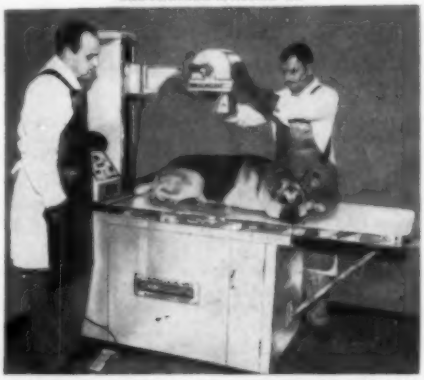
The complete line of conversion kits for Motorola equipment manufactured since 1949 is now available with delivery starting on or before June 1.

Retired Veterinarian Is Now an Inventor

Dr. W. H. Boyd, a retired veterinarian in Sacramento, Calif., is now spending his time perfecting various items which he used in the field when he was a practitioner.

Dr. Boyd is the inventor and producer of a cattle lifter sling and an air pressure choke remover.

ANIMAGRAPH



Hospital of J. S. Lewis, Jr., V.M.D., Bedford, N.H.

Radiography

4 Outfits in **1**

Exclusive Veterinary Design

CAMPBELL X-RAY CORP.
108 Cummington St.,
Boston 15, Mass.

Kindly send me descriptive information, including prices and terms, on the Campbell X-Ray Animagraph.

Dr. _____
(Please Print)

Address _____

last Wednesday of March and July. C. S. Alvanos, Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Forest H. Stockton, 2716 S.W. 29th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m., Ireland's Restaurant, Lloyds', 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinarian Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Marvin M. Corff, McMinnville, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania, School of Veterinary Medicine. Raymond C. Snyder, N. E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary Ct., Richmond 20, Va., secretary.

Northern Virginia Veterinary Conference, the second Tuesday of each month. Francis E. Mullen, 1130 S. Main St., Harrisonburg, Va., secretary-treasurer.

Northern Virginia Veterinary Society, the Second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blackburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle, Wash. William S. Green, 9637 S. E. 36th, Mercer Island, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. O. I. Bailey, P. O. Box 906, Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). R. J. O'Hern, P.O. Box 617, Cumberland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. W. E. Lyle, P. O. Box 107, Deerfield, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. E. S. Scobell, Rt. 2, Wausau, Wis., secretary.

Dr. F. E. Husmann Accepts Appointment as Fort Dodge Laboratories Consultant

Dr. F. E. Husmann (ISC '52) of Augusta, Ill., has accepted a position as professional consultant on the staff of Fort Dodge Laboratories, Inc., it has been announced. Prior to his appointment, Dr. Husmann was a general practitioner in Augusta for six years.

Suppressing Excessive Growth in Young Females with Estrogen.—Two girls about 12 years old, 64.5 and 66.4 inches tall and growing at rates of 2.5 and 3.0 inches per year, were given about 4.5 and 3.5 mg. of conjugated estrogenic substance daily by mouth for about 24 and 17 months, respectively. Both then grew much less than they would have otherwise. Regular menstruation occurred following cessation of therapy. —*J.Am.M.A. (March 15, 1958): 1322.*

Seeing Eye Dogs

Seeing eye dogs are usually German Shepherds, but other breeds are also used. No distinction is made between males and females when selecting these dogs. The training begins at about 14 months of age and lasts for three months plus an additional month with the future owner.

Approximately two thirds of the 2,600 persons who use seeing eye dogs are men.—*Dog World (April, 1958): 8.*

Cats of All Ages Quickly Show The Benefits of a Daily Diet of Puss 'n Boots

Balanced whole-fish formula gives complete nutrition, sure results

Your cat-owner clientele will be delighted at the difference Puss 'n Boots makes in the health, vigor and appearance of their pets. Regular feeding of Puss 'n Boots can often produce dramatic results in just three weeks or even less.

Puss 'n Boots *whole fish* formula supplies all the vital nutrients cats *and* kittens are known to need. High-quality proteins for strength and energy . . . calcium for sound teeth and bones . . . vitamins and minerals for soft, glossy fur . . . tasty cereals for regularity . . . extra Vitamin B_1 for appetite, sound nerves and good digestion.

You can recommend Puss 'n Boots with complete confidence. Available at food and pet stores everywhere.

Coast Fisheries Division of The Quaker Oats Company, Chicago, Ill.

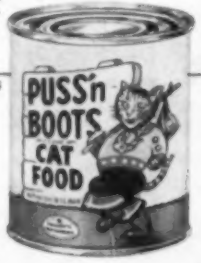
How the Natural Life Balance of WHOLE FISH is Retained in Puss 'n Boots

Costly Fillets, rich in high quality proteins. Usually reserved for human consumption, but *retained in Puss 'n Boots.*

Liver and Glands, for minerals and vitamins. Vital for health. Often extracted for medicinal use, but *retained in Puss 'n Boots.*

Bone Structure, for valuable calcium and phosphorus. Made soft, crumbly and digestible, and *retained in Puss 'n Boots.*

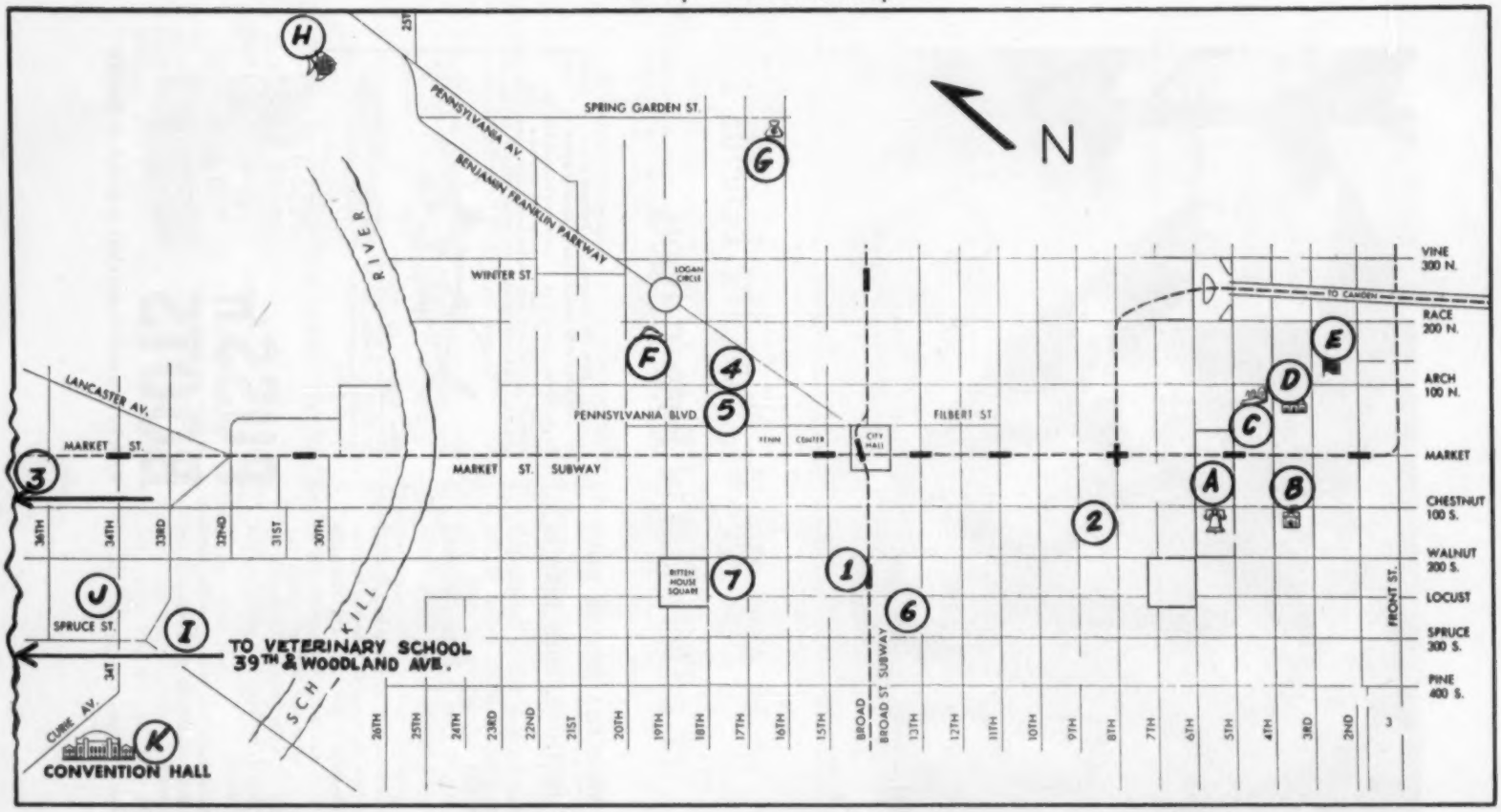
Packed in 8-oz. and 15-oz. sizes



PUSS'n BOOTS

Rich in the nutrients that are rich in health

Philadelphia Location Map



1. Bellevue-Stratford Hotel
2. Benjamin Franklin Hotel
3. Penn-Sherwood
4. Robert Morris (not pictured)
5. Sheraton Hotel
6. Sylvania Hotel
7. Warwick Hotel

A. Independence Hall
B. Carpenters' Hall
C. Franklin's Grave
D. Friends' Meeting House
E. Betsy Ross House
F. Academy of Natural Sciences
G. U.S. Mint (Guided Tours)
H. Aquarium
I. University Museum
J. University of Pennsylvania
K. Convention Hall

HOTEL RESERVATIONS — PHILADELPHIA CONVENTION

Ninety-Fifth Annual AVMA Meeting, Aug. 18-21, 1958

All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

Hotels and Rate Schedule

Hotel	Single	Double	Twin	Suite
1. Bellevue-Stratford †	$ 9.00-11.00	$12.00-16.00	$12.00-17.00	$30.00-50.00*
2. Benjamin-Franklin †	9.00-11.00	12.00-15.00	16.00-18.00	.....
3. Penn Sherwood †	6.00- 7.50	11.00	13.50-14.00	15.50*
4. Robert Morris †	6.00	9.50	11.00	.....
5. Sheraton †	9.85-13.50	13.00	15.00-17.00	30.50-41.00*
6. Sylvania ††	7.50- 9.50	.....	10.00-13.00	25.00-27.50*
7. Warwick †	10.00-12.00	.....	15.00-18.00	30.00-35.00*

† Air-Conditioned
†† Partly Air-Conditioned
* 2-room suite

FAMILY PLAN — The 7 hotels listed above offer a "Family Plan" whereby children under 14 years of age receive accommodations free of charge. For more detailed information, contact the Housing Bureau.

Tear Off

RESERVATION FORM — AVMA CONVENTION — PHILADELPHIA

To: Housing Bureau, Philadelphia Convention and Visitors Bureau, Inc., Penn Square Building, Juniper & Filbert Sts., Philadelphia, Pa.

Hotel	Accommodations
(Three choices MUST be shown)	_____Single Room(s) @ $_____
First choice hotel _____	_____Double Room(s) @ $_____
Second choice hotel _____	_____Twin-bed Room(s) @ $_____
Third choice hotel _____	_____2-Room Suite @ $_____

Arriving on (Date) _____ at _____ ( ) a.m. ( ) p.m.

Departing on (Date) _____

Will be occupied by (attach list of additional names if necessary).

Your Name (print or type) _____

Street Address _____

City _____ Zone _____ State or Province _____

All the essential amino acids
. . . in a well-balanced, readily usable
form—that's Abbott's

Aminosol®

(Modified Fibrin Hydrolysate Injection, Abbott)

Especially prepared for veterinary parenteral therapy, this modified protein hydrolysate of *beef blood fibrin* provides a mixture of approximately ⅔ free amino acids and ⅓ small peptides. Such a balance is most valuable in severe infectious diseases; debilitating and traumatic conditions; febrile diseases; pre- and post-surgical cases, and in certain metabolic diseases.

AMINOSOL (*except where sodium chloride has been added*) *contains less than 230 mg.—10 milliequivalents—sodium ion per liter. Result: Safer therapy for the patient on a low-sodium regimen!*

And the "meaty" flavor of AMINOSOL 5% with Dextrose 5% in Water is highly palatable to small animals, especially puppies. Thus, if a portion of the bottle is left following parenteral therapy, it may be given to the patient orally.

AMINOSOL is supplied in three forms: AMINOSOL 5% Solution (List No. 4426), in 500 and 1,000-cc. bottles; AMINOSOL 5% with Dextrose 5% Solution (List No. 4421), in 250, 500 and 1,000-cc. bottles; and AMINOSOL 5% with Dextrose 5% in Alcohol 5% (List No. 4437), in 1,000-cc. bottles. Order from your Abbott representative, your distributor or direct from Abbott Laboratories,
North Chicago, Illinois.

Abbott

BEEFSTEAK IN A BOTTLE

Write for Abbott's new booklet, *"A Practical Approach to Fluid Therapy in Veterinary Medicine."*

805116

CLASSIFIED ADVERTISEMENTS

PERSONAL WANT ADS—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

COMMERCIAL WANT ADS—$5.00 for the first 25 words, 25 cents for each additional word; $1.00 for use of box number.

THE TOTAL WORD COUNT must include complete box number address or personal address line.

Remittance must accompany ad.

DEADLINES

1st of month issue — 8th of month preceding date of issue.

15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

Veterinarian wanted in large animal practice. Assistant leading to partnership. Central Iowa. Address "Box H 33," c/o JOURNAL of the AVMA.

Poultry pathologist wanted—state laboratory, Russellville, Ark. State retirement plus social security. Position open July 1, 1958; recent graduate accepted. Salary $6,000 per year. Give full particulars in first letter. Address Livestock Sanitary Board, P.O. Box 2821, Little Rock, Ark.

Graduate veterinarian, preferably single, to assist in general practice from late June until mid-September in central New England. License not necessary. Drs. F. F. Tenny and D. H. Fritz, Peterborough, N.H.

Wanted—senior student for the summer months. Old established small animal hospital. Give particulars and salary expected. Address "Box K 6," c/o JOURNAL of the AVMA.

Opportunity with a future for an ambitious, hard working veterinarian. Established small animal hospital for over 30 years, 50 miles from New York City. Some meat inspection; good salary commensurate with experience and ability. New York state license required. Send qualifications. Address "Box K 7," c/o JOURNAL of the AVMA.

Wanted—Positions

Graduate (ISC '56) desires position in small animal practice in Middlewest. Licensed Iowa, Illinois. Military obligation completed in August. Address "Box H 2," c/o JOURNAL of the AVMA.

Relief veterinarian, experienced and competent, available during August for New York City and suburbs. Address "Box K 9," c/o JOURNAL of the AVMA.

Graduate, 1956, married, being discharged from service in August, desires position with a general practitioner. Licensed in Delaware, Maryland, Virginia, and North Carolina. Address "Box K 11," c/o JOURNAL of the AVMA.

Veterinarian, foreign, 1951 graduate, would like employment in any phase of the veterinary profession in eastern part of the U.S. Married; age 33. Address "Box K 12," c/o JOURNAL of the AVMA.

Veterinarian (Auburn, Ala., graduate) desires change Aug. 1, 1958. Ten years' experience, small animals, all phases. Married, no children. Address "Box K 10," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

Established small animal hospital for sale; fully equipped, x-ray, outdoor runs, landscaped 8-room colonial home. Main thoroughfare, New York State. Large animal potential. $15,000 to handle. Address "Box G 3," c/o JOURNAL of the AVMA.

Modern small animal hospital, fully equipped, member of A.A.H.A., with large animal facilities and pasture. Grossing over $48,000 a year. Excellent Southeast location. Other interest reason for sale. Address "Box H 25," c/o JOURNAL of the AVMA.

Established practice for sale in Indiana. Modern home on highway, with 14 acres. Office, drugs, and instruments—all ready to step in and take over. Large and lucrative territory for veterinarian. Reason for selling: husband's death. Mrs. Clyde Page, Carlisle, Ind.

General practice for sale in Canada, choice western Ontario location, excellent opportunity for ambitious young man. Generous terms with or without real estate. Address "Box K 5," c/o JOURNAL of the AVMA.

Kennel Cage Units

of Wire Mesh and Metal

IN TWO TIERS: 4, 6, and 8 cage units
IN THREE TIERS: 6, 9, and 12 cage units

Sanitary, durable, easily maintained; galvanized materials; removable pans; hand woven wire mesh doors, maximum light and ventilation; sized for dogs and cats; removable partitions; shipped crated; easily assembled.

THE EIGHT CAGE UNIT
Shipped unassembled, saves freight charges
Terms may be arranged

EAST RIVER WIRE WORKS
39-40 Twenty-First St., Long Is. City 1, N.Y.

Mixed practice, 85% dairy, on Oregon coast, Tillamook County. Large four-bedroom home, basement clinic with street entrance. Asking $25,000. Includes drugs, equipment, some furniture. Address "Box H 29," c/o JOURNAL of the AVMA.

Established general practice for sale. Includes beautiful home and veterinary clinic, drugs, two-way radio, x-ray, and equipment. Requires Pennsylvania license and $10,000 down. Address "Box K 2," c/o JOURNAL of the AVMA.

Established general practice in north central Wisconsin. Good setup for two veterinarians if interested in large city potential. Gross in excess of $15,000 yearly. Recently built ranch-style home and office appraised at $35,000. Opportunity for doubling income with state and federal work and small animal practice. Home, office, drugs—$40,000; $25,000 down. Low overhead, good clientele, steady income. Address "Box K 3," c/o JOURNAL of the AVMA.

For immediate sale—small animal hospital and residence. Location: fast-growing area of New York state. Address "Box K 4," c/o JOURNAL of the AVMA.

Modern small animal hospital, built 1954, Danville, Va. Kirschner plastic cages installed. Excellent location. Reasonable terms. Dr. W. K. Barker, 1700 Chadwick Drive, Richmond, Va.

Printing

Gummed labels on roll printed to order; handy dispenser. Quantity buying cheaper—store safely through polyethylene protection. Money back guarantee. Postcard brings samples. Boyd's Printery, Box 462B, Genoa, Ohio.

Wanted—Books

Lungwitz "Horseshoeing"—urgent. Old veterinary books bought, sold. Free search service. Lists on request. Address "Box K 8," c/o JOURNAL of the AVMA.

Miscellaneous

For sale—slightly used Pelton and Crane Autoclave. Reasonable. Address "Box K 1," c/o JOURNAL of the AVMA.

Too Late to Classify

Experienced veterinarian desires to purchase or lease with option small animal practice in Michigan or Ohio. Substantial cash available. Address "Box K 13," c/o JOURNAL of the AVMA.

Job Opportunities in "Agribusiness"

Dr. John H. Davis, director of the program in agriculture and business, Harvard University Graduate School of Business, has coined a new word—"agribusiness"—which he defined as "the sum total of the food-fibre phase of our economy. He stated that 37 per cent of the nation's working force is engaged in it.

Farm problems will be solved to an increasing extent by teams of men from many disciplines, according to Dr. Davis, much as teams of scientists combine their talents to put a satellite aloft.

DAILY LOG
RECORD SUPPLIES FOR VETERINARY PHYSICIANS

WRITE FOR FREE CATALOG

A complete line of Record Supplies and Professional Stationery designed specifically for the medical profession.

- Financial Record Book
- Appointment Book
- Printed Stationery
- Patients' Records
- File Guides
- Payment Records

NEW 1958 EDITION

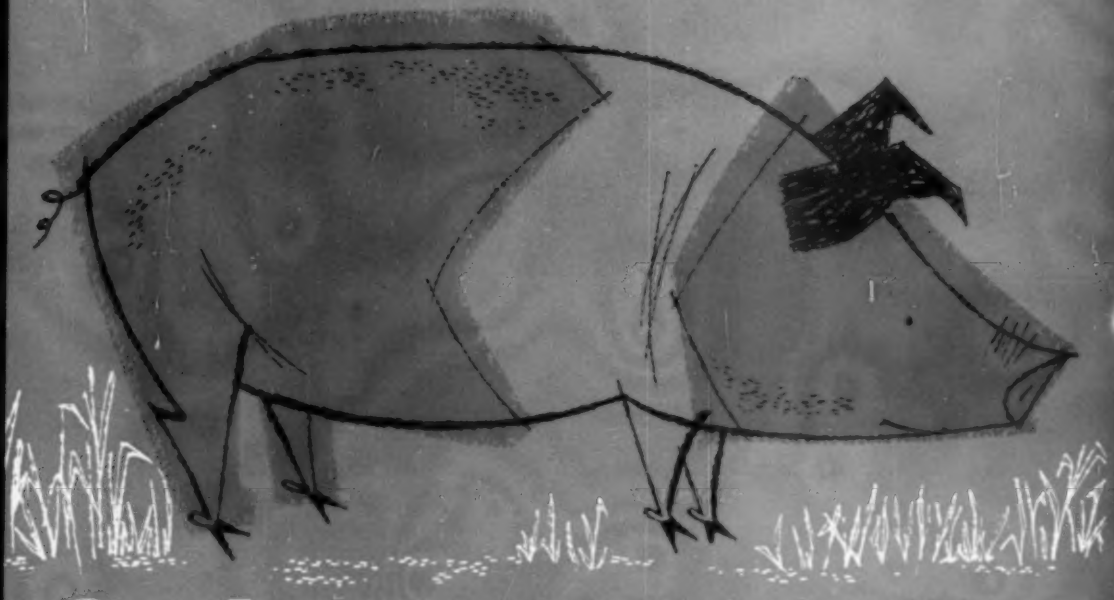
COLWELL PUBLISHING CO.
381 University Ave., Champaign, Ill.

Index to Advertisers in This Issue

Abbott Laboratories 46
Affiliated Laboratories Corp. 15
Armour Veterinary Laboratories 8, 9
Campbell X-Ray Corp. 41
Carter-Luff Chemical Co. 31
Ciba Pharmaceutical Products, Inc. 23
Clipper Service 39
Colwell Publishing Co. 48
Corn Belt Laboratories, Inc. 4
Corn States Laboratories, Inc. .. 2nd cover
Diamond Laboratories 11
East River Wire Works 47
Eaton Laboratories 29, 34
Fort Dodge Laboratories 5, 20
Fromm Laboratories 38
Haver-Lockhart Laboratories 32, 33
Heidenbrand & Son 39
Hotel Reservations 44, 45
Jensen-Salsbery Laboratories, Inc. ... . 37, 4th cover
Ken-L Products 26
Massengill Company, S. E. 6
Nicholson Manufacturing, Inc. 13
Norden Laboratories 1
Parke, Davis & Company 21
Parlam Corporation 30
Pfizer 40
Pitman-Moore Company .... 3, 3rd cover
Professional Printing Company 24
Puss n' Boots Cat Food 43
Ralston-Purina Co. 12
Schering Corp. 18, 19
Squibb ..... Insert between pp. 16, 17
Sun Ray Hair Preparations 28
United States Savings Bonds 16
Warner-Chilcott Laboratories 17
Westwood Pharmaceuticals 7
Winthrop Laboratories, Inc. 10
Woodlets, Inc. 27

SAFETY FIRST...

with lasting protection



Swivax*

The superior hog-cholera vaccine for **SOLID** immunity...

MODIFIED LIVE VIRUS • RABBIT ORIGIN • VACUUM DRIED

*REGISTERED TRADE MARK

(Licensed under U.S. Patent 2518076)

PITMAN-MOORE COMPANY division of **ALLIED LABORATORIES, INC.**

first tranquilizer developed and approved specifically for relief of stress in animals gives you a stake in a $5,500,000,000 industry

Estimates place the annual loss to the livestock industry from stress conditions alone at $250,000,000. As the exclusive source for Diquel, you play a major role in providing stockmen with the first important advance toward reduction of those losses.

Never before has the livestock industry expressed such active interest in a new approach to a common problem. To the stockman, Diquel offers greater profit through reduction of weight loss and improved appetite during periods of stress (weaning, adjustment to new environment, handling); fewer injuries in transit; easier handling and greater resistance to shipping fever and stress diseases.

Widespread Diquel publicity and advertising in livestock and general farm publications is creating a diversified and growing demand for your services and products. Moreover, Diquel was developed, packaged and priced to help you meet that demand in a manner financially beneficial to you and your clients. As a dispensing item or for professional use, it offers the convenience, dependability and economy you must have to serve your clients best.

Order Diquel from your Jen-Sal Branch or representative. Free professional and client literature available on request.

Jensen-Salsbery Laboratories, Inc., Kansas City, Missouri

Jen-Sal